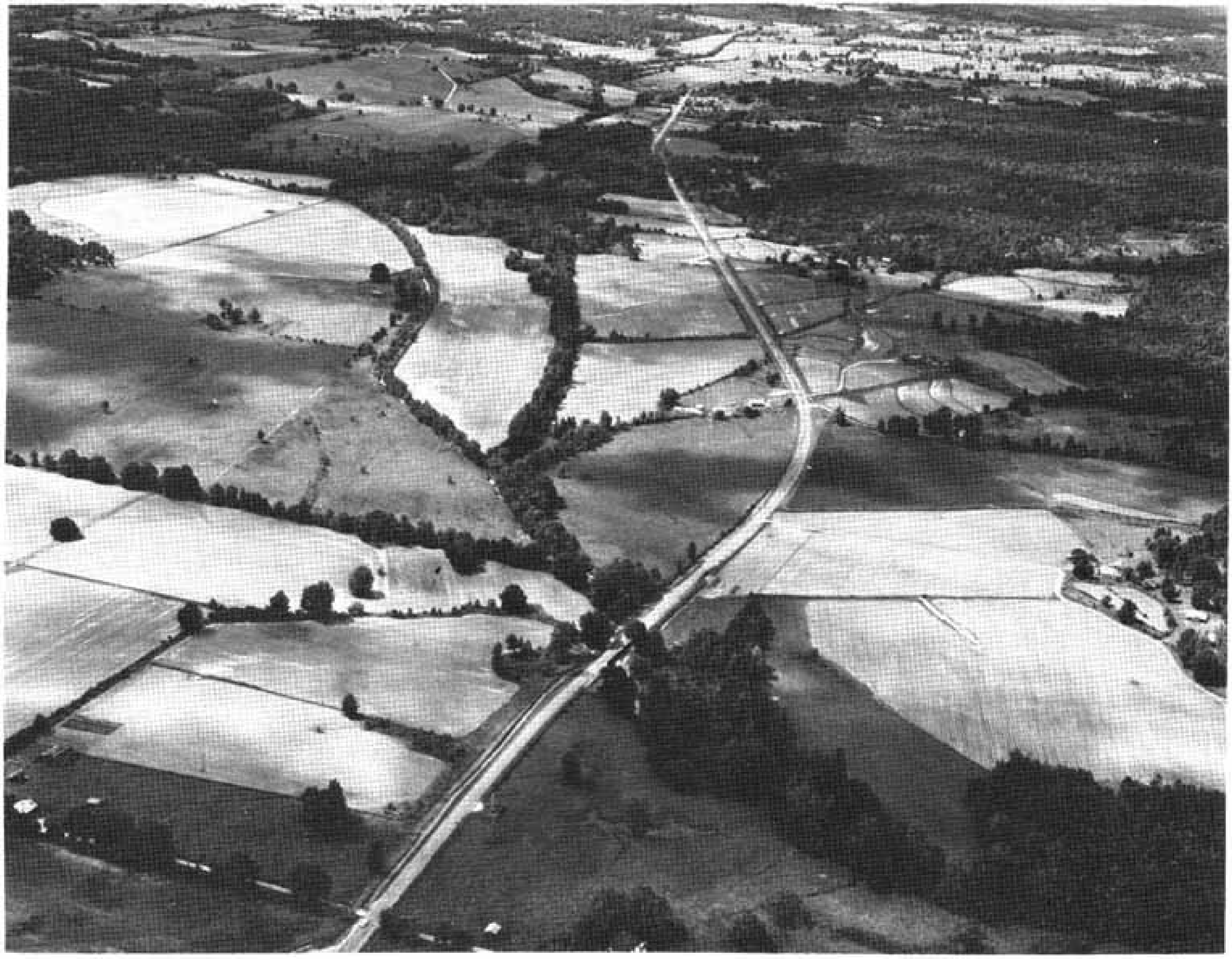
SOIL SURVEY OF

Yalobusha County, Mississippi

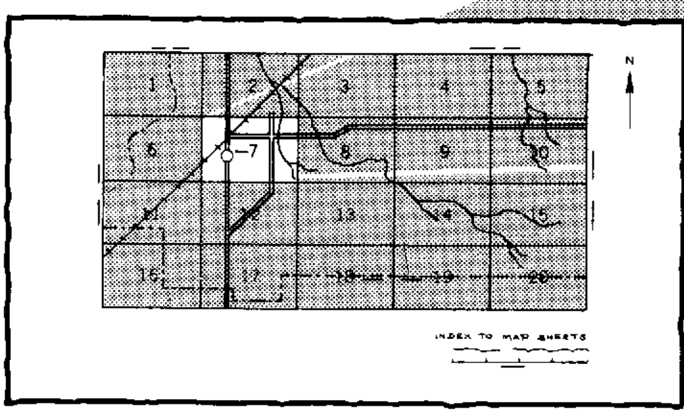


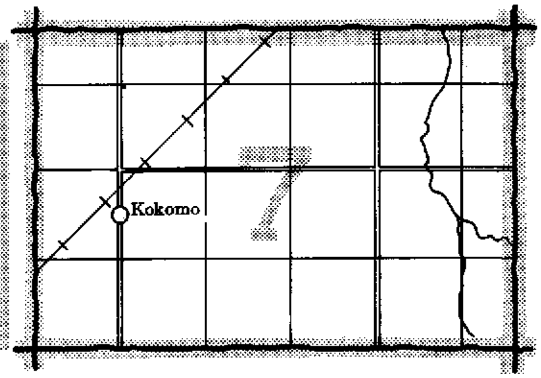
United States Department of Agriculture
Soil Conservation Service and Forest Service

In cooperation with
Mississippi Agricultural and Forestry Experiment Station

HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).





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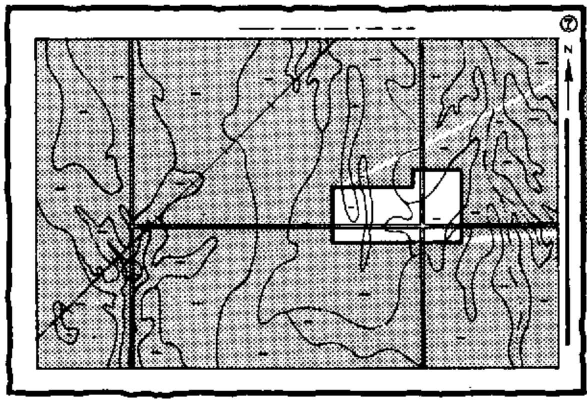

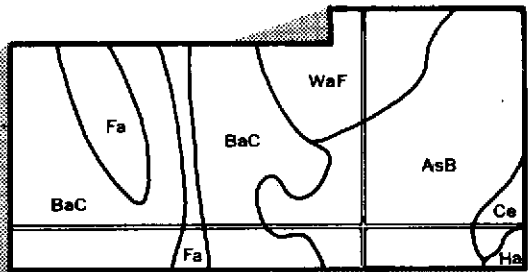

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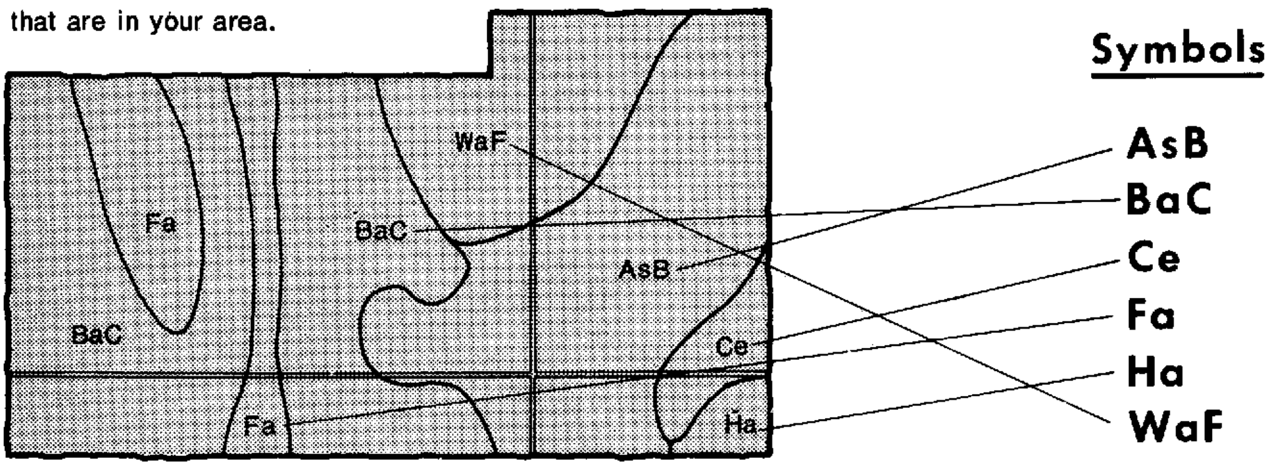
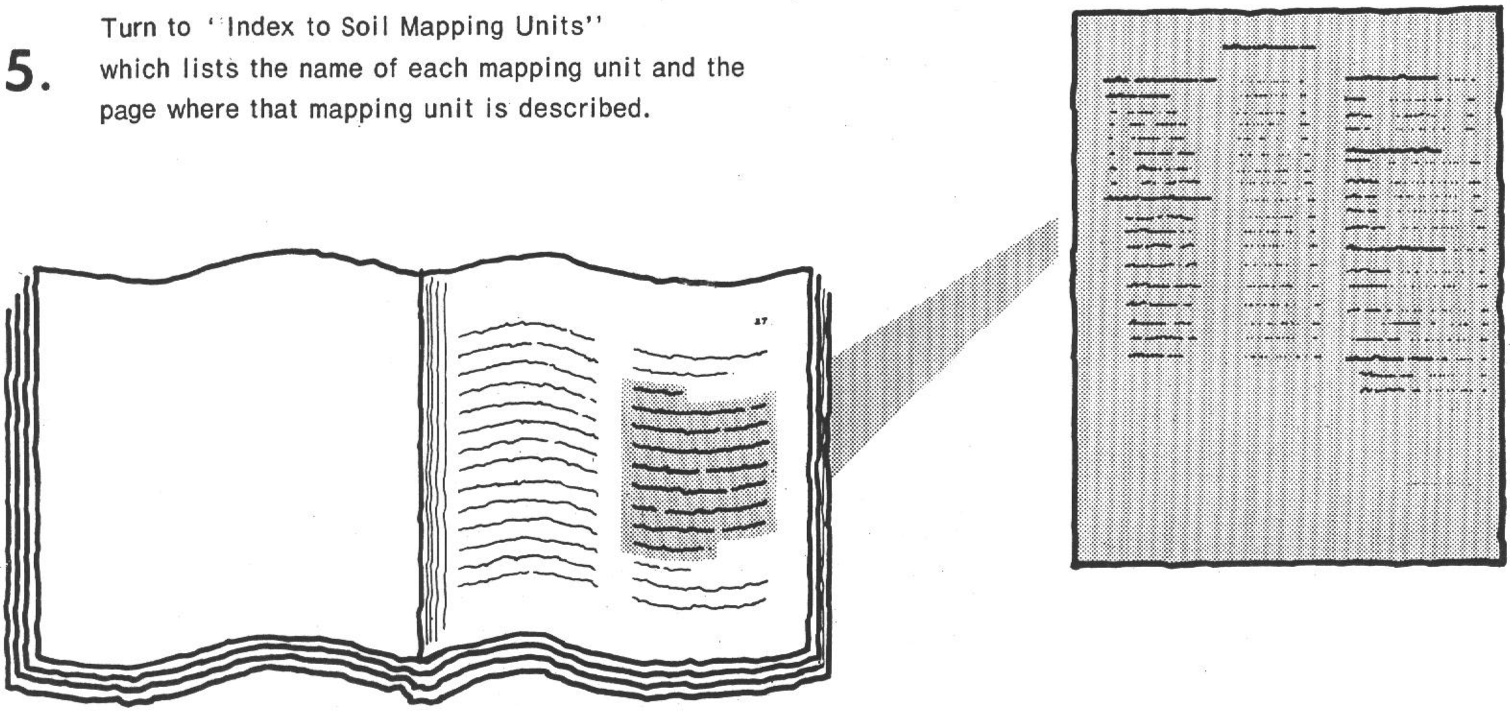
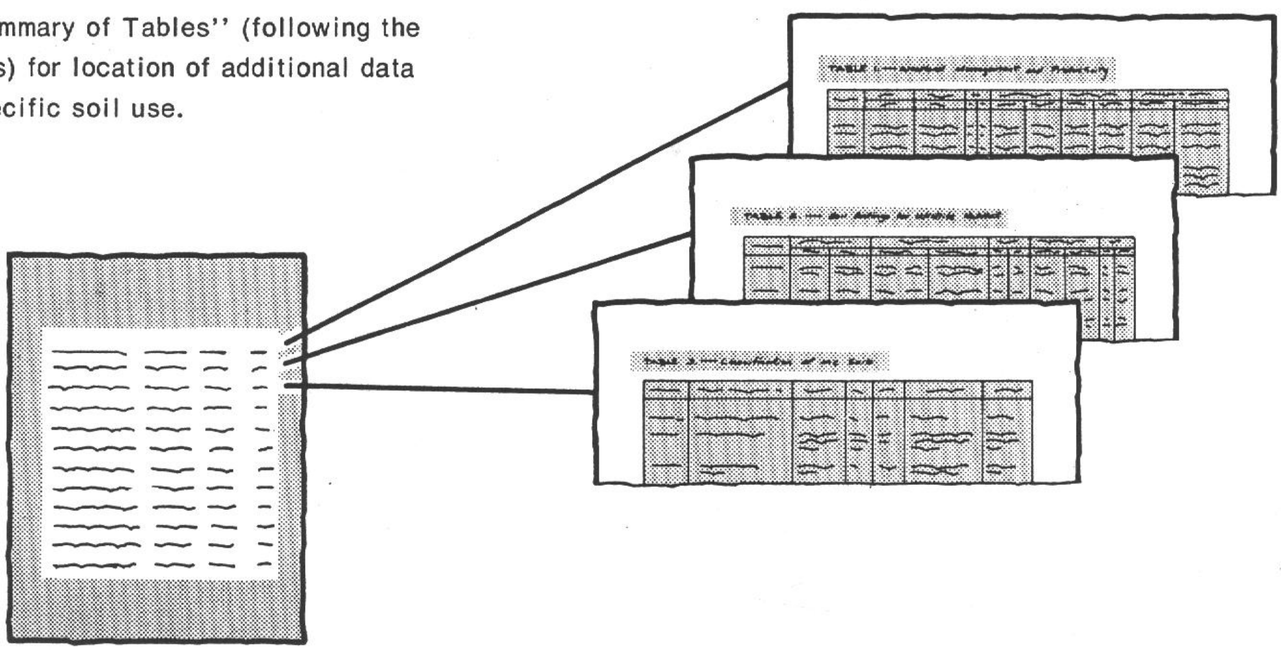


THIS SOIL SURVEY

5. Turn to "Index to Soil Mapping Units" which lists the name of each mapping unit and the page where that mapping unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all who need the information, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1965-75. Soil names and descriptions were approved in 1975. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1975. This survey was made cooperatively by the Soil Conservation Service, Forest Service, and Mississippi Agricultural and Forestry Experiment Station. It is part of the technical assistance furnished to the Yalobusha County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: Aerial view showing cropland along a major stream channel. Openland, foreground, planted to cotton and soybeans on Collins-Oaklimeter Association. Smithdale-Providence Association, in background, is mostly wooded.

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Foreword

I would like to introduce the soil survey of Yalobusha County, Mississippi. This publication can help you and your community to plan and to use wisely one of our most precious natural resources—the soil.

This soil survey is intended for many different users. It can help a homebuyer or developer determine soil related hazards or limitations that affect homesites. It can help land use planners determine the suitability of areas for housing or onsite sewage disposal systems. This survey can help a farmer estimate the potential crop or forage production of his land. It can be used to determine the suitability and limitations of soils for pipelines, buildings, landfills, recreation areas, and many other uses.

Why do we need soil information? Many people assume that soils are all more or less alike. They are unaware that great differences in soil properties can occur within even short distances.

Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

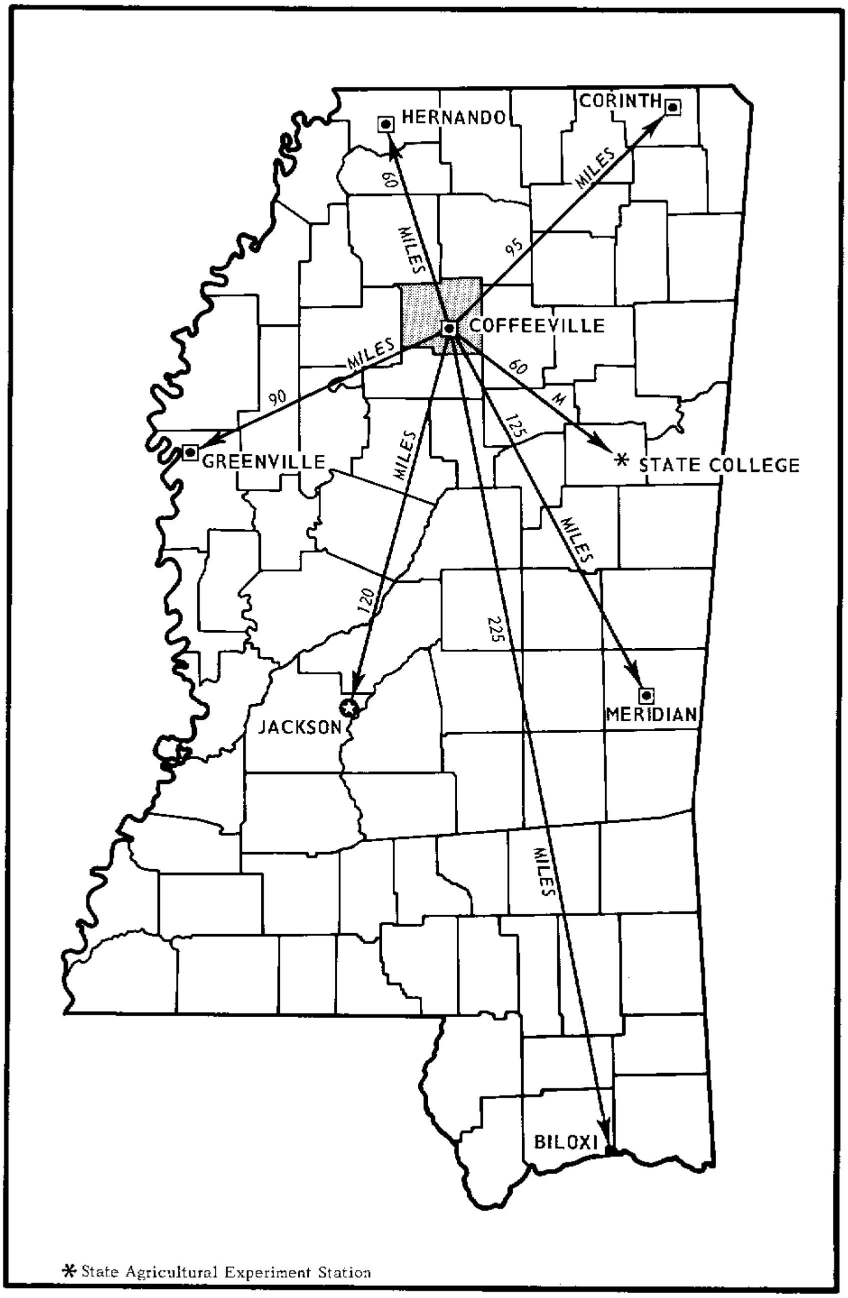
These and many other soil properties that affect land use are described in this soil survey. The survey also shows the location of broad areas of soils on the general soil map and the location of each kind of soil on detailed maps at the back of this publication. The publication provides descriptions of each kind of soil in the survey area, and much information is given about each soil for specific uses. Highlighted are soil related hazards, limitations, and potential for various land uses.

If you need additional information or assistance in using this survey, please call your local office of the Soil Conservation Service or the Cooperative Extension Service. The soil conservationist or soil scientist assigned to the Yalobusha County Soil and Water conservation district or the county extension director can assist you.

I believe that this soil survey, along with other resource information, will enable you to have a better environment and a better life. The widespread use of this publication will greatly assist all of us in the conservation, development, and productive use of our soil, water, and related resources.

W. L. Heard

State Conservationist
Soil Conservation Service



Location of Yalobusha County in Mississippi.

SOIL SURVEY OF YALOBUSHA COUNTY, MISSISSIPPI

By Jerry S. Huddleston, Charles D. Bowen, and Jimmy G. Ford,
Soil Conservation Service, United States Department of Agriculture

United States Department of Agriculture, Soil Conservation Service and Forest Service, in cooperation with Mississippi Agricultural and Forestry Experiment Station

Yalobusha County is approximately 125 miles north of Jackson, Mississippi. Coffeeville and Water Valley are the county seats and principal towns. The county has a total area of 322,560 acres, of which about 22,560 acres of water is the acreage of the Enid and Grenada Reservoirs.

The county is bounded on the north by Panola and Lafayette Counties, on the east by Calhoun County, on the south by Grenada County, and on the west by Tallahatchie County. It is approximately 24 miles long and 20 miles wide.

General Nature of the County

This section gives general information concerning the county. It discusses settlement, natural resources, climate, farming, physiography, and water areas.

Climate

The principal influences that determine the climate of this county are the subtropical latitude, the huge land mass to the north, the proximity to the warm waters of the Gulf of Mexico, and the prevailing southerly winds.

In summer the prevailing southerly winds provide a moist, tropical climate, but occasionally the atmospheric pressure distribution brings west or north winds and hot, dry weather, which may develop into a drought such as those of 1924, 1925, 1954, and 1960. In winter Yalobusha County is subjected alternately to moist, tropical air and dry, polar air. These changes sometimes bring sharp changes in temperature. Cold spells, however, are usually short. The growing season is about 225 days.

The relative humidity is 60 percent or higher 65 percent of the time and 40 percent or less only 12 percent of the time. When the temperature is 90 degrees F or higher, relative humidity seldom exceeds 80 percent but ranges between 50 and 79 percent 26 percent of the time. Even when the temperature is below 50 degrees F, the relative humidity is greater than 50 percent more than half of the time.

Data on temperature and precipitation are given in table 1, and the probabilities of the last freezing temperature in spring and the first in fall are given in table 2.

Winter and spring are the wettest seasons, and summer and fall are the driest seasons, although the differences are small. October is the driest month and is generally the most pleasant month of the year. Winter and spring precipitation often come as prolonged rain, usually as a result of warm Gulf air aloft, overriding a mass of cold air at the surface. Precipitation during summer and early in fall is in the form of thundershowers. The showers are generally widely scattered and may bypass an area day after day, causing local droughts. On the other hand, 24 hour precipitation of 3 inches or more may occur in any month and cause local flash floods.

Temperatures of 32 degrees F or lower occur an average of 60 days a year. Temperatures of 90 degrees F or higher occur in about 12 percent of the hours from May through October, and temperatures of 80 degrees F or higher occur in about 32 percent of the hours in these

months. During the months of November through April, temperatures are 70 degrees F or higher in about 9 percent of the hours and below 50 degrees F in about 44 percent of the hours. Temperatures of 20 degrees F or lower occur at least once each winter. The ground freezes occasionally, but this freeze is usually shallow and thaws rapidly.

In table 2 probabilities of temperature thresholds of 36 degrees F and 40 degrees F are included because frost can form on vegetation under a clear sky and in calm air at night when the temperature indicated on a thermometer 5 feet above ground in a shelter is above 32 degrees. These low temperatures, even though above freezing, can adversely affect vegetation or seeds in beds. The data for the 36 degree and 40 degree thresholds are based on a 30 year record from 1931 to 1960, and the rest of the data are based on a 30 year record from 1921 to 1950. These data have been adjusted to account for the years without temperature as low as the indicated threshold. The data on freezes are applicable to most of the county.

Snow or sleet occurs an average of 2 out of every 3 years, usually during January. Since temperature below freezing lasts only 1 to 3 days, snow stays on the ground for only a few days.

Thunderstorms occur rather frequently; tornadoes and hailstorms are less frequent. Winds from hurricanes seldom penetrate inland as far as Yalobusha County, but prolonged, heavy rains from hurricanes can occur.

Settlement of the County

The earliest settlers in the area now known as Yalobusha County were the Choctaw and Chickasaw Indians. The forests were full of deer, some bears, wolves, turkeys, raccoons, opossums, and squirrels. The southern part of the county was held by the Choctaw Indians and the northern part belonged to the Chickasaw Indians.

Missionaries were the first settlers to come into the territory. Later hunters, trappers, and farmers came for the good climate and favorable hunting.

Yalobusha County, created December 23, 1833, was originally 900 square miles. The size of the county later decreased to 490 square miles after the eastern part became Calhoun County and Grenada County was formed from the southern part.

Yalobusha County was settled by families that had emigrated from Alabama, South Carolina, Virginia, Tennessee, and Georgia. A few families mainly from Norway and Sweden also settled in the county.

The Mississippi Central Railroad was completed in the county in 1860. It was later purchased by the Illinois Central Railroad. Railroads have played an important part in the economic development of the county.

In 1873 Yalobusha County was divided into two districts. Water Valley is the county seat of one district and Coffeeville the county seat of the other.

The population of Yalobusha County was 12,248 in 1840; 16,629 in 1890; 15,191 in 1950; 12,502 in 1960; and 11,915 in 1970.

Physiography, Relief, and Drainage

Yalobusha County lies within the Coastal Plain physiographic province of the United States. The western one-third of the county is mantled with loess, or wind deposited silt. It is several feet thick near the western boundary but becomes distinctly thinner in the eastern part. Only ridgetops are covered with loess in the eastern part of the county.

Yalobusha County is generally hilly with narrow ridgetops and medium wide bottom land. A few rolling areas are mainly in the western part. Elevation ranges from about 190 feet along the Skuna River in the southern part of the county to about 500 feet on ridges in the northeastern part.

Grenada Reservoir and Skuna River are the main drainageways for the eastern and southern parts of the county. Skuna River has an average gradient of 4.2 feet per mile. The northwestern part of the county drains into Enid Reservoir and Yocona River. Yocona River has an average gradient of 3 feet per mile. Tillatoba Creek and its north and south forks drain the western part of the county.

Water Areas

Enid and Grenada Reservoirs are not included in the acreage table. These are large flood control reservoirs and account for most of the water in Yalobusha County. About 10,240 acres are in Grenada Reservoir, and 12,320 acres are in Enid Reservoir. Only about 440 acres of Grenada Reservoir and 6,600 acres of Enid Reservoir are considered permanent pools. The remainder is shown on the agricultural census as land area, however, all areas covered by water as much as 9 to 12 months per year are considered water in this soil survey. Grenada and Enid Reservoirs are regulated by the U.S. Army Corps of Engineers, and water levels are down to the permanent pool elevation for only a short time. Water levels are generally at or near the lowest elevations about December 1. Winter and spring rains cause the water to rise to its highest level in May or June, after which the water recedes gradually to minimum levels by December. The amount of the area covered and the depth of water fluctuates throughout the year. The area covered by water 9 to 12 months per year cannot be used for any kind of farming operation.

The waters of these reservoirs and several small floodwater retarding structures furnish excellent fishing and recreation. Enid and Grenada Reservoirs are less than a two hour drive from Memphis, Tennessee, and are used by the people of a large surrounding area.

Farming

Farming is the main source of income in Yalobusha County. The main crops harvested are soybeans and cotton. In 1969 about 9,000 acres of soybeans was harvested,

with an average yield of 25 bushels per acre. In the same year 7,400 acres of cotton was harvested, with an average yield of 595 pounds of lint per acre. Other crops grown in the county are corn, oats, and wheat. In 1970 23,400 cattle and 3,300 hogs were in the county. The cattle included eight U.S. Grade A dairy herds. Approximately one-half of the county is wooded.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil mapping units. Some mapping units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Mapping units are discussed in the section "Soil Maps for Detailed Planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and their interpretatons are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily useful to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

Soil Map for General Planning

The general soil map at the back of this publication shows, in color, the soil associations described in this survey. Each soil association is a unique natural landscape unit that has a distinct pattern of soils and of relief and drainage features. An association typically consists of one or more soils of major extent and some soils of minor extent. It is named for the major soils. The kinds of soil in one association can occur in other soil associations, but in a different pattern.

The map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are generally suitable for certain kinds of farming or other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure; the kinds of soils in any one soil association ordinarily differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

The soil associations in the survey area vary widely in their potential for major land uses. Table 3 shows the extent of each soil association and gives general ratings of the potential of each, in relation to the other soil associations, for each major land use. Adverse soil properties that pose limitations to the use are indicated. The ratings of soil potential are based on the assumption that practices in common use in the county are used to overcome soil limitations. These ratings reflect the ease of overcoming such soil limitations and the probability of soil problems persisting after such practices are used. The location of existing transportation systems or other kinds of facilities is not considered.

Each association is rated for *cultivated farm crops, specialty crops, woodland, urban uses, intensive recreation areas* and *extensive recreation areas.* Cultivated farm crops are those grown extensively by farmers in the survey area. Specialty crops include vegetables, fruits, and nursery crops grown on limited acreage and generally requiring intensive management. Woodland refers to land that is producing either trees native to the area or introduced species. Urban uses include residential, commercial, and industrial developments. Intensive recreation

areas are campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic. Extensive recreation areas include those used for nature study and as wilderness.

Descriptions of Soil Associations

Areas Dominated by Nearly Level Soils that are Subject to Flooding

1. Collins-Oaklimeter Association

Moderately well drained, nearly level silty soils on flood plains

This association is mostly in the central and western parts of the county and makes up about 11 percent of the county. It is about 50 percent Collins soils, 25 percent Oaklimeter soils, and 25 percent minor soils.

The Collins and Oaklimeter soils are throughout the area; both are silty throughout and have a seasonal high water table. The Collins soils are mainly along natural stream channels.

Minor soils in this association are the well drained Ariel and Cascilla soils and the excessively drained Bruno soils.

Most of this association has been cleared and is used for row crops, but some areas are wooded. Occasional floods on these soils cause slight or moderate crop damage; however there is high potential for cultivated crops and pasture plants. These soils have high potential and no significant limitations for woodland use and management. The potential for residential, industrial, and commercial development is low because of flooding. If protected from flooding, the area has high potential for these uses. The area has a high potential for openland wildlife habitat and for most recreational uses (fig. 1).

2. Oaklimeter-Gillsburg Association

Moderately well drained and somewhat poorly drained, nearly level silty soils; on flood plains

This association is mostly in the eastern part of the county. It makes up about 9 percent of the county. The association is about 48 percent Oaklimeter soils, 27 percent Gillsburg soils, and 25 percent minor soils.

Oaklimeter soils are moderately well drained, and Gillsburg soils are somewhat poorly drained. Both soils are silty throughout and have a seasonal high water table.

Minor soils in this association are the well drained Ariel soils, the moderately well drained Collins soils, and the somewhat poorly drained Arkabutla soils.

Most of this association has been cleared and is used for cultivated crops and pasture. Some areas are wooded. Occasional floods on these soils cause slight or moderate crop damage; however, there is high potential for row crops, pasture, and woodland. Wetness may limit use of equipment in winter and spring. This association has low potential for residential, industrial, and commercial development. Where protected from flooding, it is only moderately limited for these uses. The potential as habitat for openland wildlife is high. The area has medium to low potential for most recreational uses where it is not protected from flooding.

3. Arkabutla-Collins-Oaklimeter Association

Somewhat poorly drained and moderately well drained, nearly level silty soils; on flood plains subject to flooding from reservoir backwaters

This association is on flood plains of streams flowing into Enid and Grenada Reservoirs. These areas are upstream from the reservoirs and are below the maximum high water elevation. They are subject to frequent and severe flooding.

This association makes up about 4 percent of the county. It is about 39 percent Arkabutla soils, 21 percent Collins soils, 21 percent Oaklimeter soils, and 19 percent minor soils.

The Arkabutla soils are on the slightly lower elevations in most places. They are somewhat poorly drained. The Collins and Oaklimeter soils are typically in bands along natural stream channels. They are moderately well drained. All three soils are silty throughout and have a seasonal high water table.

Minor soils in this association are the excessively drained Bruno soils and the somewhat poorly drained Gillsburg soils.

Most of this association is used for pasture and hay crops. Because of the severe flood hazard, it has low potential for cultivated crops. A few areas are in row crops, principally soybeans, which are planted late in the season. The area has medium potential for pasture and hay crops, but winter and spring grazing may be limited by flooding and wetness. This area has high potential for woodland. Wetness and flooding restrict crop management and harvest to dry periods. Because of the severe flood hazard, this association has low potential for all residential, industrial, and commercial development. It has moderate potential as openland and wetland habitat for wildlife. Recreational potential is low, except for hunting and fishing.

Areas Dominated by Nearly Level and Gently Sloping Soils on Uplands

4. Grenada-Calloway Association

Moderately well drained and somewhat poorly drained, nearly level to gently sloping, silty soils that have a fragipan; on uplands

Small areas of these soils are adjacent to the flood plains of Skuna River and Otoucalofa and Turkey Creeks.

This association makes up about 2 percent of the county. It is about 60 percent Grenada soils, 25 percent Calloway soils, and 15 percent minor soils.

The nearly level to gently sloping Grenada soils are at higher elevations. They are moderately well drained. The

somewhat poorly drained Calloway soils are on broad flats. Both soils are silty and have a fragipan that perches water during wet periods and that restricts penetration of roots.

Minor soils in this association are the somewhat poorly drained Gillsburg soils on narrow flood plains and the poorly drained Bonn soils on flat uplands.

Most of this associaton is used for cultivated crops and pasture. The association has high potential for row crops and pasture plants. It has high potential for woodland and medium potential for most residential, commercial, and industrial development. Potential as openland habitat for wildlife and for most recreational uses is high.

5. Bonn-Gillsburg-Deerford Association

Poorly drained and somewhat poorly drained, silty soils that are high in sodium and are on uplands, and somewhat poorly drained silty soils on flood plains

This association is in the eastern part of the county, north of and adjacent to the Skuna River flood plain. It makes up about 1 percent of the county. The association is about 35 percent Bonn soils, 30 percent Gillsburg soils, 20 percent Deerford soils, and 15 percent minor soils.

The Bonn soils are poorly drained and silty throughout. Slopes are nearly level and concave. They have a high concentration of exchangeable sodium at a depth of less than 16 inches. The Gillsburg soils are along drainageways and on flood plains that run through the area. They are somewhat poorly drained and silty throughout. The nearly level Deerford soils are at higher elevations. They are somewhat poorly drained and silty throughout. They have a high concentration of exchangeable sodium below a depth of about 21 inches.

Most of this association is used as pasture and hayland. The association has medium potential for pasture, hayland and for cultivated crops. The high amount of exchangeable sodium in the Bonn and Deerford soils restricts plant growth. The Bonn soils have low potential for woodland; the rest of the soils have high potential for woodland. Potential for all residential, industrial, and commercial development is low because most of the area is regulated by the U.S. Army Corps of Engineers. Potential as openland habitat for wildlife is medium. The association is suitable for most types of recreation.

Areas Dominated by Sloping and Strongly Sloping Soils on Uplands

6. Loring-Memphis Association

Moderately well drained silty soils that have a fragipan, and well drained silty soils; on uplands

These gently to strongly sloping soils are in the western part of the county. This association makes up about 7 percent of the county. It is 70 percent Loring soils and 12 percent Memphis soils. The rest is minor soils.

The intermingled Loring and Memphis soils are on ridgetops and side slopes. Both are silty throughout. The Loring soils have a fragipan below a depth of about 31 inches that restricts roots and water. The well drained Ariel soils and the moderately well drained Collins soils are in small areas in narrow alluvial valleys.

Most of this association is used for row crops and pasture. Small areas are wooded. The gently sloping to sloping soils on broad ridgetops have high potential for cultivated crops and pasture. These soils are highly erodible, and conservation practices are needed. This association has high potential for pasture and woodland. It has medium potential for most residential, industrial, and commercial development. It has high potential as openland habitat for wildlife and for most recreational uses.

7. Providence-Loring Association

Moderately well drained silty soils that have a fragipan; on broad ridgetops and strong side slopes

Small areas of this association are in the central part of the county. This association is dominantly gently sloping to strongly sloping silty soils. Narrow valleys of alluvial soils break the rolling landscape.

This association makes up about 4 percent of the county. It is 60 percent Providence soils, 24 percent Loring soils, and 16 percent minor soils.

The intermingled Providence and Loring soils are on ridgetops and side slopes. The Providence soils are generally steeper. Both Providence and Loring soils are silty above the fragipan. The Loring soils are silty throughout. The Providence soils are very sandy below the fragipan.

Minor soils in this association are the moderately well drained Collins and Oaklimeter soils in narrow valleys.

This association is used as pasture, cropland, and woodland. It has low potential for row crops. Slope and the hazard of erosion are the main limitations. The gently sloping and sloping areas are suitable for row crops if proper conservation measures are applied. This association has high potential for pasture and hayland. It has moderately high potential for woodland use and medium potential for residential, industrial, and commercial development. The potential as openland and woodland habitat for wildlife is high. The association has high potential for most recreational uses.

Areas Dominated by Hilly Soils on Uplands

8. Smithdale-Providence Association

Well drained, steep loamy soils on side slopes, and moderately well drained silty soils that have a fragipan and are on narrow ridgetops

This association is in all parts of the county except along the western edge. Areas are hilly with narrow to medium ridgetops and narrow valleys.

This association makes up about 51 percent of the county. It is about 49 percent well drained Smithdale soils, 36 percent moderately well drained Providence soils, and 15 percent minor soils.

Smithdale soils are mainly on side slopes. They have a loamy surface layer and a loamy subsoil. Providence soils are generally on ridgetops and upper side slopes. Providence soils are silty in the upper part and loamy below a depth of about 3 feet. They have a fragipan.

Minor soils in the association are the moderately well drained Loring and well drained Maben soils on hills and the moderately well drained Collins and Oaklimeter soils and somewhat poorly drained Gillsburg soils in narrow valleys.

Most of this association is used as woodland. The narrow bottoms, ridgetops, and rolling areas are used mostly for pasture and row crops. This association has low potential for cultivated crops and medium potential for pasture and hayland. Slope and the hazard of erosion are the main limitations. This association has moderately high potential for woodland. A few areas are suitable for industrial, commercial, and residential development; but, because of steep slopes, most of the areas have severe limitations for these uses. The potential for use as woodland habitat for wildlife is high and for use as habitat for openland wildlife is medium. Hunting, fishing, hiking, and horseback riding are suitable recreational uses.

9. Maben-Smithdale-Tippah Association

Well drained and moderately well drained, clayey, loamy, and silty soils; on side slopes

These soils are mainly in the eastern part of the county. The association is hilly with narrow to medium ridgetops and narrow valleys.

This association makes up about 6 percent of the county. It is about 37 percent Maben soils, 35 percent Smithdale soils, and 10 percent Tippah soils. The rest are minor soils.

Maben soils are mainly on mid and lower side slopes. They have a loamy surface layer and a clayey subsoil. Smithdale soils are on side slopes. They are loamy and have a high content of sand. The Tippah soils are mainly on ridgetops and upper side slopes. They are silty in the upper part and have a clayey subsoil.

Minor soils in this association are the moderately well drained Providence soils on ridgetops and the somewhat poorly drained Gillsburg and the moderately well drained Oaklimeter soils in narrow valleys.

Almost all of this association is used as woodland. Some narrow flood plains, ridgetops, and sloping areas are used for pasture and crops. Because of steep slopes and the erosion hazard, this area has low potential for cultivated crops. It has low potential for pasture and hayland and moderately high potential for woodland. It has low potential for residential, industrial, and commercial development because of steep slopes and low strength. A few sites within the area, however, are suitable for these uses.

The potential as habitat for woodland and openland wildlife is high. Because of slope, this area has low potential for most recreational uses. Hunting, fishing, hiking, and horseback riding are suitable recreational uses, and a few sites are suitable for use as campsites and picnic areas.

10. Memphis-Loring-Providence Association

Well drained silty soils on side slopes, and moderately well drained silty soils that have a fragipan; on ridgetops and upper side slopes

This association is in the western part of the county. The hilly landscape is broken by medium ridgetops and narrow valleys. Much of this association is severely eroded, and some areas are gullied.

This association makes up about 5 percent of the county. It is about 30 percent well drained Memphis soils, 30 percent moderately well drained Loring soils, 20 percent moderately well drained Providence soils, and 20 percent minor soils.

Memphis soils are on the steeper side slopes and on some ridgetops. They are silty throughout. Loring soils are mainly on upper side slopes and ridgetops. They are silty throughout and have a fragipan. Providence soils are on side slopes and ridgetops throughout the association. They are silty in the upper part and loamy below a depth of about 3 feet. Providence soils have a fragipan.

Minor soils in this association are mainly the moderately well drained Collins and Oaklimeter soils on narrow flood plains.

Almost all of this association is used as woodland. Some of the side slopes, ridgetops, and narrow flood plains are used for pasture and crops. This association has low potential for cultivated crops and medium potential for pasture and hayland. Steep slopes and the erosion hazard are limitations for cultivated crops. This association has high potential for woodland. It has low potential for most urban uses; steepness is the main limitation. The potential for woodland wildlife is high and for openland wildlife is medium. Hunting, fishing, hiking, and horseback riding are suitable recreational uses.

Broad Land Use Considerations

Approximately 20 percent of Yalobusha County is used for cultivated crops. Several areas have high potential for farming. These areas are identified as associations 1, 2, and 4 on the General Soil Map at the back of this publication. Associations 1 and 2 flood occasionally, causing slight crop damage. Wetness is the major limitation for growing crops. The major soils of associations 1 and 2 are those of the Collins, Oaklimeter, and Gillsburg series. Wetness is also the major limitation for association 4, but floods are rare. The soils in association 4 are those of the Grenada and Calloway series.

About 20 percent of Yalobusha County is in pasture. Soil associations 1, 2, 4, 6, and 7 have high potential for pasture and hay crops. The dominant soils of these as-

sociations are those of the Collins, Oaklimeter, Gillsburg, Grenada, Calloway, Loring, Memphis, and Providence series.

Most soils of the county have high potential for woodland. Exceptions are those soils of the Bonn-Gillsburg-Deerford associations. Commercially valuable trees do not grow as well on the Bonn soils of this association as they do on soils of the other associations. Bonn and Deerford soils have high amounts of sodium, which hinders plant growth.

About 7,600 acres in Yalobusha County has been developed for urban use. Areas having the highest potential for urban development are the nearly level to gently sloping soils of the Grenada and Calloway series and the sloping to strongly sloping soils of the Loring, Memphis, and Providence series. These soils are identified on the General Soil Map as associations 4, 6, and 7. Wetness, low strength, and slope are the main limitations. Most of these soils perc slowly and are limited for use as septic tank absorption fields. Most of these limitations can be overcome through proper management. Collins, Oaklimeter, Gillsburg, and Arkabutla soils have low potential for urban development because of the flood hazard. The Bonn-Gillsburg-Deerford association has low potential because of wetness. The hilly areas of Maben, Smithdale, Tippah, Memphis, Loring, and Providence soils have low potential for urban development because of slope. Certain sites within these hilly areas, however, are suitable for houses and small commercial buildings.

Most associations in the county have medium to high potential for recreational uses. Associations 1, 2, and 3 are on flood plains, and flooding is a limitation. Associations 8, 9, and 10 are hilly. Slope limits their use as intensive recreational areas, but they are suitable for such activities as hunting, hiking, and horseback riding. A few areas within these associations are suitable for use as campsites and picnic areas. Potential for wildlife habitat is discussed in the section "Use and Management of the Soils."

Soil Maps for Detailed Planning

The kinds of soil (mapping units) shown on the detailed soil maps at the back of this publication are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each soil is given in the section "Use and Management of the Soils."

Preceding the name of each mapping unit is the symbol that identifies the unit on the detailed soil map. Each mapping unit description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated and the management concerns and practices needed are discussed.

A soil mapping unit represents an area on the landscape and consists mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map at the back of this publication are phases of soil series.

Soils that have profiles that are almost alike make up a *soil series.* Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. All the soils in the United States having the same series name have essentially the same properties that affect their use and their response to management practices.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristic that affects the use of the soils. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Loring silt loam, 2 to 5 percent slopes, eroded, is one of several phases within the Loring series.

Some mapping units are made up of two or more dominant kinds of soil. Two such kinds of mapping units are shown on the soil map of this survey area: soil complexes and soil associations.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Loring-Udorthents complex, gullied, is an example.

A *soil association* is made up of soils that are geographically associated and are shown as one unit on the map. A soil association has considerable regularity in geographic pattern and in the kinds of soil that make up the associaton. The extent of the soils can differ appreciably from one delineation to another; nevertheless, interpretations can be made for the expected uses of the soils. Maben-Smithdale association, hilly is an example.

Most mapping units include small, scattered areas of soils other than those that appear in the name of the mapping unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the mapping unit. The soils that are included in mapping are recognized in the description of each mapping unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. "Pits" is an

example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each mapping unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses are given for each kind of soil in other tables in this survey. (See "Summary of Tables.") Many of the terms used in describing soils are defined in the Glossary.

Water areas, as shown in table 4, consist of perennial streams, lakes, and ponds less than about 40 acres in size. They are covered with water in most years during the growing season. A few old borrow pits that contain water most of the time also are included.

Soil Descriptions and Potentials

Ae—Ariel silt loam, occasionally flooded. This deep, well drained soil is on flood plains and low stream terraces throughout the county. Slopes are 0 to 2 percent.

Typically the surface layer is dark yellowish brown silt loam about 7 inches thick. The subsoil, extending to a depth of 32 inches, is dark yellowish brown and brown silt loam. Below this, to a depth of 60 or more inches, is a buried soil of brownish silt loam with grayish mottles.

Included with this soil in mapping are a few small areas of Cascilla, Collins, and Oaklimeter soils.

This soil is strongly acid or very strongly acid, except for the surface layers in areas that have been limed. It has high available water capacity and moderately slow permeability. This soil floods occasionally. Runoff is slow.

Most of this soil is cultivated or used for pasture. This soil has a high potential for growing row crops, pasture, and hay. It is well suited to cotton, soybeans, grasses, and legumes. Return of crop residue helps maintain good tilth. Row arrangement and field ditches are needed to help remove excess surface water.

This soil has a very high potential for growing cherrybark oak, eastern cottonwood, sweetgum, yellow-poplar, and loblolly pine. There are no significant limitations for woodland use or management.

This soil has low potential for urban uses because of the flood hazard.

Ar—Arkabutla silt loam, occasionally flooded. This deep, somewhat poorly drained soil is on flood plains throughout the county. Slope is 0 to 2 percent.

Typically the surface layer is dark brown silt loam about 7 inches thick. The upper 10 inches of the next layer is dark yellowish brown silt loam with grayish mottles and a few fine black concretions. Below this, to a depth of 48 inches, is light brownish gray silt loam with yellowish brown mottles and few black and brown concretions.

Small areas of Cascilla, Gillsburg, and Oaklimeter soils are included in the mapped areas of this soil.

This soil is strongly acid or very strongly acid. The surface layer in areas that have been limed is less acid. Permeability is moderate, and the available water capacity is high.

Most areas of this soil are cultivated or used as pasture. The rest is woodland. This soil has high potential for row crops, pasture plants, and trees. Seedbed preparation and tilth are sometimes delayed because of wetness. Occasional floods cause slight to moderate crop damage. Surface runoff is slow. Returning crop residue to the soil helps prevent crusting and packing of the soil.

This soil has very high potential for such trees as green ash, eastern cottonwood, cherrybark oak, loblolly pine, sweetgum, yellow-poplar, and American sycamore. Wetness is a moderate limitation in managing and harvesting trees, but it can be overcome by using special equipment and by logging during dry periods.

This soil has low potential for urban use because of wetness and the flood hazard.

Au—Arkabutla silt loam, frequently flooded. This deep, somewhat poorly drained soil is on flood plains that are subject to flooding by the Enid and Grenada Reservoirs. Slope is 0 to 2 percent.

Typically the surface layer is dark brown silt loam about 7 inches thick. The 10 inches below it is dark yellowish brown silt loam with grayish mottles and a few fine black concretions. Below this, and extending to a depth of 48 inches, is light brownish gray silt loam with yellowish brown mottles and few black and brown concretions.

Included with this soil in mapping are a few small areas of Cascilla, Gillsburg, and Oaklimeter soils.

This soil is strongly acid or very strongly acid. The surface layer in areas that have been limed is less acid. Permeability is moderate, and the available water capacity is high.

Most areas of this soil are wooded. A few areas are used as pasture or for soybeans. This soil has low potential for row crops. Floods are frequent and may last for several weeks during winter and spring. The soil is often ponded for several weeks after flooding. Few plants are suitable for this soil. In some years crops cannot be planted; or, if planted, they receive major damage.

This soil has medium potential for pasture and hayland. It is suited to most grasses and legumes, but flooding and wetness limit winter and early spring grazing.

This soil has very high potential for such trees as cherrybark oak, eastern cottonwood, green ash, loblolly pine, sweetgum, and American sycamore. Wetness and flooding restrict management and harvesting operations to the dry periods.

The potential of this soil for urban development is low because of wetness and the flood hazard.

Bo—Bonn silt loam. This poorly drained soil is on terraces in areas of low relief. Slope is 0 to 1 percent.

Typically the surface layer is grayish brown silt loam about 6 inches thick. Between depths of 6 and 49 inches is light brownish gray silt loam or silty clay loam with brownish mottles. Below this, to a depth of 80 inches, the soil is gray silty clay loam with brownish and yellowish mottles.

Included in mapping are small areas of Deerford and Gillsburg soils that make up about 10 to 20 percent of the mapped area.

This Bonn soil is very strongly acid to strongly alkaline. Permeability is very slow. The available water capacity is medium. Runoff is slow.

Most areas of this soil are used as pasture and woodland. A few areas are in row crops or idle land. This soil has low potential for row crops, pasture, and hay. It has a high content of sodium that restricts plant growth. A seasonal high water table is near the surface.

This soil has low potential for growing trees. Management problems include severe equipment limitations and severe seedling mortality.

This soil has low potential for urban development because of wetness and the high content of sodium.

Br—Bruno sandy loam, occasionally flooded. This deep, excessively drained soil is on flood plains throughout the county. Slope is 0 to 2 percent.

Typically the surface layer is dark brown sandy loam about 9 inches thick. It is underlain, to a depth of 60 inches, by strata of sand, sandy loam, silt loam, and loamy sand. These strata are various shades of brown and have gray mottles below a depth of about 29 inches.

A few small areas of Cascilla, Collins, and Oaklimeter soils are included in mapped areas.

This soil is strongly acid to mildly alkaline. Permeability is rapid, and the available water capacity is low.

Most areas of this soil are cultivated or are used as pasture. A few areas are wooded. This soil has low potential for such row crops as cotton or soybeans. It is droughty. Fertilizer is quickly leached, and frequent applications are needed. This soil is subject to occasional flooding.

This Bruno soil has low potential for grasses and legumes, but deep rooted plants grow fairly well if fertilizer is applied frequently.

The potential for growing such trees as green ash, cherrybark oak, nuttall oak, sweetgum, American sycamore, and yellow-poplar is high. The soil texture and the low available water capacity are moderate equipment limitations and cause moderate seedling mortality.

This soil has low potential for urban development because of the flood hazard.

Bu—Bruno sandy loam, frequently flooded. This deep, excessively drained soil is on flood plains that are subject to flooding by the Enid and Grenada Reservoirs. Slope is 0 to 2 percent.

Typically the surface layer is dark brown sandy loam about 9 inches thick. This is underlain, to a depth of about 60 inches, by strata of sand, sandy loam, silt loam, and loamy sand. The strata are in shades of brown with gray mottles below a depth of about 29 inches.

A few small areas of Cascilla, Collins, and Oaklimeter soils are included in mapped areas.

This soil is strongly acid to mildly alkaline. Permeability is rapid, and the available water capacity is low.

Most areas of this soil are used as pasture. A few areas are cultivated in some years.

This soil has low potential for row crops, grasses, and legumes. Frequent floods cause major crop damage. The rapid permeability and frequent flooding cause fertilizers to be leached rapidly.

This soil has high potential for such trees as green ash, cherrybark oak, nuttall oak, sweetgum, American sycamore, and yellow-poplar. The frequent flooding and low water holding capacity are moderate equipment limitations and cause moderate seedling mortality.

This soil has low potential for urban development because of the flood hazard.

CaA—Calloway silt loam, 0 to 2 percent slopes. This somewhat poorly drained soil is on broad flats adjacent to flood plains.

Typically the surface layer is brown silt loam about 5 inches thick. Between depths of 5 and 18 inches is yellowish brown silt loam with grayish mottles below a depth of 13 inches. Extending from 18 to 23 inches is a layer of pale brown silt loam with grayish and brownish mottles. Below this layer is a firm, compact, and brittle fragipan extending to a depth of 70 inches. It is brownish silt loam with grayish mottles.

Included with this soil in mapping are a few areas of Bonn, Deerford, and Grenada soils and a few areas of Calloway soils that have slopes steeper than 2 percent. These soils are in narrow bands 15 to 30 feet wide and slope toward adjacent flood plains.

This soil is very strongly acid to medium acid. The lower part of some soils is slightly acid or neutral. Permeability is slow, and the available water capacity is high. Runoff is slow.

Most areas of this soil are used for pasture. A few areas are in row crops or woods. This soil has high potential for growing row crops, grasses, and legumes. A perched, seasonal high water table is above the fragipan. The high water table sometimes delays preparation and cultivation.

Returning crop residue to the soil helps maintain tilth. Row arrangement and ditches help remove excess surface water.

This soil has high potential for such trees as cherrybark oak, sweetgum, water oak, and yellow-poplar. Wetness is a moderate equipment limitation, but it can be overcome by using equipment and logging during the drier seasons.

This soil has medium potential for most urban uses because of wetness, but proper design of drainage systems and careful installation procedures can overcome this limitation. The lower part of the subsoil percolates slowly and is limited for septic tank absorption fields. This limitation can be partially overcome by increasing the size of the absorption area or modifying the filter field itself.

Cc—Cascilla silt loam, occasionally flooded. This deep, well drained soil is on natural levees of the major streams of the county. Slope is 0 to 2 percent.

Typically the surface layer is brown silt loam about 7 inches thick. The subsoil, to a depth of 25 inches, is dark yellowish brown silt loam with a few pale brown mottles.

Between depths of 25 and 59 inches the subsoil is yellowish brown silt loam with brownish mottles. The underlying material extends to a depth of about 72 inches and is yellowish brown loam with brownish mottles.

Small areas of Ariel, Collins, and Oaklimeter soils are included with this soil in mapping.

This soil is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and runoff is slow. The available water capacity is high.

This soil has high potential for growing row crops and pature and hay plants. The root zone is deep and is easily penetrated by plant roots. Crop residue shredded and left on the surface as a mulch reduces crusting. This soil is flooded occasionally for short periods in late winter and early spring. Slight crop damage may result if overflows occur during the crop growing season. Row arrangement and surface field ditches help to remove excessive surface water.

This soil has very high potential for growing cherrybark oak, eastern cottonwood, loblolly pine, nuttall oak, sweetgum, American sycamore, and yellow-poplar. It has no significant limitations for woodland use or management.

This soil has low potential for most urban uses because of the flood hazard.

Cd—Cascilla silt loam, frequently flooded. This deep well drained soil is on natural levees of streams that are subject to flooding by Enid and Grenada Reservoirs. Slope is 0 to 2 percent.

Typically the surface layer is brown silt loam about 7 inches thick. The subsoil, to a depth of 25 inches, is dark yellowish brown silt loam with a few pale brown mottles. It is yellowish brown silt loam with brownish mottles between the depths of 25 and about 59 inches. The underlying material, to a depth of about 72 inches, is yellowish brown loam with brownish mottles.

Small areas of Collins and Oaklimeter soils are included with this soil in mapping.

This soil is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and runoff is slow. The available water capacity is high.

This soil has low potential for growing row crops. It floods frequently, and the floods may last for several weeks during winter and spring. The choice of suitable plants is limited. A few areas are planted to soybeans in late spring. In some years crops cannot be planted; in others they receive major damage from flooding.

This soil has medium potential for pasture and hayland. It is suited to most grasses and legumes, but grazing in winter and early spring is limited by flooding and wetness.

This soil has very high potential for cherrybark oak, eastern cottonwood, loblolly pine, nuttall oak, sweetgum, American sycamore, and yellow-poplar. Wetness and flooding are severe equipment limitations that restrict management and harvesting to the drier seasons.

Potential for urban development on this soil is low because of the flood hazard.

Cn—Collins silt loam, occasionally flooded. This moderately well drained soil is on flood plains throughout the county. Slope is 0 to 2 percent.

Typically the surface layer is brown silt loam about 9 inches thick. Between depths of 9 and 18 inches is brown silt loam with common mottles in shades of brown. Brown silt loam with mottles in shades of brown and gray is between depths of 18 and 31 inches. Between 31 and 46 inches the soil material is mottled in shades of brown and gray. Below a depth of 46 inches, it is gray silt loam with brownish mottles. Bedding planes are throughout the soil below the surface layer.

Small areas of Ariel, Cascilla, and Oaklimeter soils are included with this soil in mapping. A few small sandy spots are also included.

This soil is strongly acid or very strongly acid. It has a very high available water capacity. Permeability is moderate, and surface runoff is slow. The soil has good tilth and can be worked during a wide range of moisture conditions. The root zone is deep and easily penetrated by plant roots.

This soil has high potential for row crops and pasture and hay plants (fig. 2). Crop residue shredded and left on the surface as a mulch reduces crusting. This soil is flooded occasionally for short periods in late winter and early spring. Slight crop damage may result if overflows occur during the crop season. Row arrangement and surface field ditches help remove excess surface water.

This soil has very high potential for green ash, eastern cottonwood, and cherrybark oak. It has no significant limitations for woodland use or management.

This soil has low potential for most urban uses because of the flood hazard.

Co—Collins silt loam, frequently flooded. This moderately well drained soil is on flood plains that are subject to flooding by the Enid and Grenada Reservoirs. Slope is 0 to 2 percent.

Typically the surface layer is brown silt loam about 9 inches thick. Brown silt loam with common mottles in shades of brown is between the depths of 9 and 18 inches. From 18 to 31 inches, the silt loam is brown and is mottled in shades of brown and gray. Between 31 and 46 inches the soil material is mottled in shades of brown and gray. Below a depth of 46 inches, it is gray with brownish mottles. Bedding planes are throughout the soil material below the surface layer.

Small areas of Ariel, Cascilla, and Oaklimeter soils are included with this soil in mapping. A few small sandy spots are also included.

This soil is strongly acid or very strongly acid. It has a very high available water capacity. Permeability is moderate, and surface runoff is slow.

This soil has low potential for growing row crops. It floods frequently, and the floods may last for several weeks during winter and spring. The choice of suitable plants is limited. A few areas are planted to soybeans in

late spring. In some years crops cannot be planted; in others they receive major damage from flooding.

This soil has medium potential for pasture and hayland. It is suited to improved bermudagrass, but grazing in winter and early spring is limited by flooding and wetness.

This soil has very high potential for Shumard oak, loblolly pine, sweetgum, and yellow-poplar. Wetness and flooding restrict management and harvesting to the drier seasons.

Potential for urban development of this soil is low because of the flood hazard.

De—Deerford complex. These somewhat poorly drained soils are on broad, flat terraces adjacent to flood plains. Most mapped areas are in the eastern part of the county adjacent to the Skuna River flood plain. Most areas are subject to flooding by the floodway of the Grenada Reservoir, and the lower areas are subject to flooding from high backwaters. Slope is 0 to 2 percent.

The soils in this complex are in such an intricate pattern and change within such short distances that it was not practical to map each separately.

Deerford silt loam is the dominant soil of this unit. Typically it has a surface layer of yellowish brown silt loam about 8 inches thick. Between the depths of 8 and 21 inches, the layer is yellowish brown silt loam with grayish mottles. From a depth of 21 inches to about 60 inches is yellowish brown silty clay loam and silt loam with grayish mottles.

The soil material is very strongly acid to medium acid to a depth of 31 inches and ranges to moderately alkaline below 31 inches. These soils contain a high amount of exchangeable sodium below a depth of about 21 inches. The available water capacity is medium. Permeability and runoff are slow.

Areas of these soils are similar to the Deerford soil but are browner and slightly better drained.

Included with these soils in mapping are a few small areas of Bonn, Calloway, and Gillsburg soils and a few small areas where the sand content is high.

The soils of this complex have medium potential for growing row crops, pasture, and hay. Row arrangement and surface field ditches help remove excess surface water. Seedbed preparation and tillage are usually delayed by wetness. A perched water table is at a depth of about 6 inches to 18 inches during winter and spring. The high content of exchangeable sodium restricts plant growth. Returning crop residue to the soil helps prevent crusting and packing.

These soils have high potential for loblolly pine, sweetgum, and water oak. Wetness is a moderate equipment limitation, and use of logging equipment is restricted to the drier seasons.

This complex has medium potential for most urban uses. Wetness and low strength are limitations, but these can be overcome through good design and careful installation procedures. A perched water table and slow percolation limit the use of these soils for septic tank absorption fields.

These soils have medium potential for most urban uses.

Ga—Gillsburg silt loam, occasionally flooded. This somewhat poorly drained soil is on flood plains and low stream terraces. Slope is 0 to 2 percent.

Typically the surface layer is a brown silt loam about 5 inches thick. The next layer, to about 13 inches, is mottled brown and pale brown silt loam. The soil material between the depths of 13 and 19 inches is mottled in shades of brown and gray. Below this, to a depth of about 44 inches, is gray silt loam with brownish mottles. The underlying layer, to a depth of 60 inches, is gray loam with brownish mottles.

Included with this soil in mapping are a few small areas of Ariel and Oaklimeter soils.

This soil is strongly acid or very strongly acid. The available water capacity is high. Permeability is moderately slow, and surface runoff is slow.

This soil has high potential for growing row crops, pasture, and hay. It has a seasonally high water table at a depth of about 12 to 18 inches. Seedbed preparation and tilth are sometimes delayed by wetness, and slight crop damage may result from occasional flooding. Row arrangement and surface field ditches help to remove excessive surface water. Returning crop residue to the soil helps maintain good tilth.

This soil has high potential for cherrybark oak, eastern cottonwood, green ash, loblolly pine, sweetgum, American sycamore, and yellow-poplar. Wetness is a severe equipment limitation to managing and harvesting the tree crop, but it can be overcome by using of special equipment and by logging during the drier seasons.

This soil has low potential for most urban development because of wetness and the flood hazard.

Gb—Gillsburg silt loam, frequently flooded. This somewhat poorly drained soil is on flood plains and low stream terraces that receive backwater flooding from large reservoirs. Slope is 0 to 2 percent.

Typically the surface layer is a brown silt loam about 5 inches thick. The next layer, to a depth of about 13 inches, is mottled brown and pale brown silt loam. The soil material between 13 and 19 inches is mottled in shades of brown and gray. Below this, to a depth of about 44 inches, is gray silt loam with brownish mottles. The underlying layer, to a depth of 60 inches, is gray loam with brownish mottles.

Included with this soil in mapping are a few small areas of Ariel and Oaklimeter soils.

This soil is strongly acid or very strongly acid. The available water capacity is high. Permeability is moderately slow, and surface runoff is slow.

Most of this soil is used for pasture or is wooded. A few areas are cultivated in some years. The soil has low potential for row crops because of severe flooding from reservoirs. The flooding may last several weeks in winter and spring. Ponding may last even longer. Flooding does not occur in all years; but, in those years it does occur, crops receive major damage or cannot be planted.

This soil has medium potential for pasture and hayland. It is suited to improved bermudagrass, but grazing in winter and spring is limited by wetness and flooding.

This soil has high potential for cherrybark oak, eastern cottonwood, green ash, loblolly pine, sweetgum, American sycamore, and yellow-poplar. Wetness is a severe equipment limitation to managing and harvesting tree crops. Logging operations must generally be conducted during the drier seasons.

This soil has low potential for urban uses because of the flood hazard.

GrA—Grenada silt loam, 0 to 2 percent slopes. This moderately well drained soil is on uplands and terraces adjacent to flood plains.

Typically the surface layer is dark grayish brown silt loam about 7 inches thick. It is underlain, to a depth of 26 inches, by yellowish brown silt loam with grayish mottles in the lower part. From 26 to 30 inches is dark yellowish brown silt loam with pale brown mottles. Below this, to a depth of about 52 inches, is a firm, compact, and brittle silty clay loam and silt loam fragipan that is mottled in shades of brown, yellow, and gray.

Included with this soil in mapping are a few small areas of Calloway soils. Also included in places are bands a few feet wide where slopes are steeper. These bands occur as rims between the Grenada soils and alluvial soils.

Grenada soils are medium acid to very strongly acid. The available water capacity is medium. Permeability above the fragipan is moderate, but it is slow in the fragipan. Water is perched above the fragipan during periods of high rainfall. Surface runoff is slow. The fragipan limits the rooting depth. This soil has a seasonally high perched water table at about a depth of two feet in winter and spring.

This soil has high potential for row crops, pasture, and hay. Seedbed preparation and tillage are hampered by crusting and packing and by seasonal wetness. Returning crop residue and minimum tillage help maintain good tilth. Row arrangement and surface field ditches help to remove excessive surface water.

This soil has moderately high potential for cherrybark oak, southern red oak, loblolly pine, shortleaf pine, and sweetgum. It has no significant limitations for woodland use or management.

This soil has high potential for urban uses. Wetness and low strength are limitations, but they can be overcome by proper drainage and through careful design and installation procedures. Slow percolation is a severe limitation for septic tank absorption fields, but it can be partially overcome by increasing the size of the absorption area or modifying the filter field itself.

GrB—Grenada silt loam, 2 to 5 percent slopes. This moderately well drained soil is on broad ridgetops and terraces.

Typically the surface layer is dark grayish brown silt loam about 7 inches thick. It is underlain, to a depth of 26 inches, by yellowish brown silt loam with grayish mottles in the lower part. Between 26 and 30 inches, is dark yellowish brown silt loam with pale brown mottles. Below this, to a depth of about 52 inches, is a firm, compact, and brittle silty clay loam and silt loam fragipan that is mottled in shades of brown, yellow, and gray.

Included with this soil in mapping units are some areas of rills and gall spots where there is an intermixing of the subsoil and plow layer. Also included are few small areas of Loring and Providence soils.

This soil is medium acid to very strongly acid. Permeability is moderate above the fragipan and is slow in the fragipan. The available water capacity and runoff are medium. Erosion is a hazard.

This soil has high potential for row crops, pasture, and hay. The fragipan limits rooting depth and perches water during wet periods. Crusting and packing are slight limitations for seedbed preparation and tillage. Returning crop residue to the soil helps control erosion and maintain good tilth. Contour farming, minimum tillage, terracing, and grassed waterways are practices that help control erosion.

This soil has moderately high potential for cherrybark oak, southern red oak, loblolly pine, shortleaf pine, and sweetgum. It has no significant limitations for woodland use and management.

This soil has high potential for urban uses. Wetness and low strength are limitations, but they can be overcome through proper design and careful use. The soil percolation is a severe limitation for septic tank absorption fields, but it can be overcome by increasing the size of the absorption area or by modifying the filter field itself.

LoB2—Loring silt loam, 2 to 5 percent slopes, eroded. This moderately well drained soil is on broad ridges.

Typically the surface layer is brown silt loam about 3 inches thick. Between 3 and 31 inches is dark brown silty clay loam and silt loam that is underlain, to about 65 inches, by a firm, compact and brittle fragipan. The fragipan is dark brown and dark yellowish brown silt loam with pale brown and gray mottles.

In most fields the surface layer has been thinned by erosion. In places all of the original surface has been removed. In other places the subsoil has been mixed into the plow layer. Some fields have a few rills and shallow gullies.

A few small areas of Grenada, Memphis, and Providence soils are included with this soil in mapping.

This soil is medium acid to very strongly acid. Permeability is moderate above the fragipan and is moderately slow in the fragipan. The available water capacity and runoff are medium. Erosion is a hazard. This soil has a seasonal high perched water table at a depth of 2 to 3 feet.

This soil has high potential for row crops, grasses, and legumes. Crusting and packing are slight limitations to seedbed preparation and tillage. Such conservation practices as returning of crop residue to the soil, minimum tillage, contour farming, terracing, and grassed waterways help maintain good tilth and reduce the erosion hazard.

This soil has moderately high potential for cherrybark oak, sweetgum, southern red oak, loblolly pine, and water oak. It has no significant limitations for woodland use or management.

This soil has high potential for urban development. Low strength is the main limitation, but it can be overcome by proper design and careful installation. Slow percolation is a severe limitation for septic tank absorption fields, but it can be partially overcome by increasing the size of the absorption area or by modifying the filter field itself.

LoC2—Loring silt loam, 5 to 8 percent slopes, eroded. This moderately well drained soil is on ridges.

Typically the surface layer is brown silt loam about 3 inches thick. Between 3 and 31 inches, the soil is dark brown silty clay loam and silt loam that is underlain, to a depth of 65 inches, by a firm, compact, and brittle fragipan. The fragipan is dark brown and dark yellowish brown silt loam with pale brown and gray mottles.

In most fields the surface layer has been thinned by erosion. In places all of the original surface has been removed. In other places the subsoil has been mixed into the plow layer. Some fields have a few rills and shallow gullies.

Included with this soil in mapping are small areas of Grenada, Memphis, and Providence soils.

This soil is medium acid to very strongly acid. Water moves at a moderate rate through the upper part of the subsoil and at a moderately slow rate through the fragipan. The available water capacity and runoff are medium. Erosion is a hazard. This soil has a seasonal perched water table above the fragipan.

This Loring soil has medium potential for row crops, grasses, and legumes. Such conservation practices as returning crop residue to the soil, minimum tillage, crop rotation, contour farming, terracing, and grassed waterways help maintain good tilth and reduce the erosion hazard.

This soil has moderately high potential for growing cherrybark oak, sweetgum, southern red oak, loblolly pine, and water oak. It has no significant limitations for woodland use or management.

This soil has high potential for urban development. Low strength is the main limitation, but it can be overcome by proper design and careful installation procedures. Slow percolation is a severe limitation for septic tank absorption fields, but it can be partially overcome by increasing the size of the absorption area or by modifying the filter field itself.

LoC3—Loring silt loam, 5 to 8 percent slopes, severely eroded. This moderately well drained soil is on ridges.

Typically the surface layer is brown silt loam about 3 inches thick. Between 3 and 31 inches, the soil is dark brown silty clay loam and silt loam that is underlain, to a depth of about 65 inches, by a firm, compact, and brittle fragipan. The fragipan is dark brown and dark yellowish brown silt loam with pale brown and gray mottles.

The original surface layer has been removed by erosion in most fields. Eroded spots, rills, and shallow gullies are in most mapped areas. A few deep gullies are in some areas.

A few small areas of Memphis and Providence soils are included with this soil in mapping.

This soil is medium acid to very strongly acid. Water moves at a moderate rate through the upper part of the subsoil and at a moderately slow rate through the fragipan. The available water capacity is medium. Runoff is rapid, and erosion is a severe hazard. This soil has a seasonal perched water table above the fragipan.

This Loring soil has low potential for row crops. Because of the erosion hazard, this soil should be in grasses and legumes most of the time. When the soil is used for row crops, such conservation practices as rotation of grasses and legumes, contour stripcropping, returning crop residue to the soil, minimum tillage, contour farming, terracing, and grassed waterways help reduce the erosion hazard.

This soil has moderately high potential for cherrybark oak, sweetgum, southern red oak, loblolly pine, and water oak. It has no significant limitations for woodland use or mangement.

This soil has high potential for urban uses. Low strength is the main limitation, but it can be overcome by proper design and careful installation. Slow percolation is a severe limitation for septic tank absorption fields, but it can be partially overcome by increasing the size of the absorption area or by modifying the filter field itself.

LoD2—Loring silt loam, 8 to 12 percent slopes, eroded. This moderately well drained soil is on side slopes.

Typically the surface layer is brown silt loam about 3 inches thick. Between 3 and 31 inches, the soil is dark brown silty clay loam and silt loam that is underlain to about 65 inches by a firm, compact, and brittle fragipan. The fragipan is dark brown and dark yellowish brown silt loam with pale brown and gray mottles.

In most areas the surface layer has been thinned by erosion. In places all the original surface layer has been removed. In other places the subsoil has been mixed with the surface layer. Some areas have a few rills and shallow gullies.

Included with this soil in mapping are small areas of Memphis and Providence soils.

This soil is medium acid to very strongly acid. Water moves through the upper part of the subsoil at a moderate rate and through the fragipan at a moderately slow rate. The available water capacity is medium. Runoff is rapid, and erosion is a severe hazard. This soil has a seasonal perched water table above the fragipan layer.

This Loring soil has low potential for growing row crops. Because of the erosion hazard and slope, this soil should be in grasses and legumes most of the time. When the soil is used for row crops, such conservation practices as rotation of grasses and legumes, contour stripcropping, returning crop residue to the soil, minimum tillage, contour farming, terracing, and grassed waterways help reduce the erosion hazard. This soil has medium potential for growing grasses and legumes.

This soil has moderately high potential for cherrybark oak, sweetgum, southern red oak, loblolly pine, and water oak. It has no significant limitations for woodland use and management.

This soil has medium potential for most urban uses. Low strength and slope are the main limitations, but they can be overcome by proper design and careful installation. Strong slope is a severe limitation for commercial buildings. Slow percolation and strong slopes are severe limitations that are difficult to overcome for septic tank absorption fields.

LoD3—Loring silt loam, 8 to 12 percent slopes, severely eroded. This moderately well drained soil is on side slopes.

Typically the surface layer is brown silt loam about 3 inches thick. Between 3 and 31 inches is dark brown silty clay loam and silt loam that is underlain to about 65 inches by a firm, compact, and brittle fragipan. The fragipan is dark brown and dark yellowish brown silt loam with pale brown and gray mottles.

In most fields the original surface layer has been removed by erosion. Eroded spots, rills, shallow gullies, and a few deep gullies are in most areas.

Included with this soil in mapping are small areas of Memphis and Providence soils. Also included are a few areas that do not have gullies.

This soil is medium acid to very strongly acid. Water moves at a moderate rate through the upper part of the subsoil and at a moderately slow rate through the fragipan. The avilable water capacity is medium. Runoff is rapid, and erosion is a severe hazard.

Because of the erosion hazard and slope, this soil has low potential for growing row crops. It has medium potential for grasses and legumes. When this soil is used as pasture, the gullies are shaped and smoothed. Management concerns include proper stocking, controlled grazing, and brush and weed control.

This soil has moderately high potential for cherrybark oak, sweetgum, southern red oak, loblolly pine, and water oak. It has no significant limitations for woodland use or management.

This Loring soil has medium potential for most urban uses. Low strength and slope are the main limitations, but these can be overcome by proper design and careful installation. Strong slopes are a severe limitation for commercial buildings. Slow percolation and strong slopes severely limit use of this soil, for septic tank absorption fields.

LrE—Loring-Udorthents complex, gullied. This complex consists of areas of very severely eroded soils that are mostly in the western part of the county. Loring soils are too intermingled with soils in gullies to be mapped separately at the scale of mapping. Slope is about 5 to 25 percent.

Loring soils make up about 18 percent of each mapped area. Typically the surface layer is brown silt loam about 3 inches thick. Between 3 and 31 inches the soil is dark brown silty clay loam and silt loam that is underlain, to a depth of about 65 inches, by a firm, compact, and brittle fragipan. The fragipan is dark brown and dark yellowish brown silt loam with pale brown and gray mottles.

Loring soils are medium acid to very strongly acid. Water moves through the upper part of the subsoil at a moderate rate and through the fragipan at a moderately slow rate. The available water capacity is medium. Surface runoff is rapid.

Udorthents make up 73 percent of this complex. They are loamy and contain a large amount of silt. Many of the wide gullies are U-shaped. They have flat floors made up of thin strata of silt and sand. The combined depth of the strata is about 40 inches. The strata are dominantly silt. Many gully floors have stabilized and now support pine trees. The gully walls, which range from 2 to 30 feet in height, are almost vertical. Many support no vegetation. In some areas the gullies have eroded through the mantle of silty material and exposed sandy soil material.

Some of the gullies, that are less than 5 feet deep are V-shaped and have little or no accumulation of material on the gully floor.

The soils in the gullies are strongly acid or very strongly acid. Available water capacity and permeability vary. Surface runoff is rapid.

The soils of this complex have low potential for row crops, grasses, and legumes. Erosion is a severe hazard. Where gullies are less than about 4 feet deep and slope is less than 12 percent, some areas can be smoothed and used as pasture. This requires establishing the area with adapted grasses and legumes, high fertilization, and controlled grazing. If very careful management practices are not followed, the area reverts to gullies within a short time.

This complex is better suited to growing pine trees than to other uses. It has a severe seedling mortality rate, but established trees have a moderate growth rate. The steep gully walls and the somewhat inaccessible ridges between the gullies are severe limitations for woodland use and management, but they can be overcome through the use of special equipment.

These soils have low potential for urban use because of the slope, the severe hazard of erosion, and the small size of areas between gullies.

MAE—Maben-Smithdale association, hilly. This association consists of well drained, hilly soils that occur in a regular and repeating pattern. The landscape is chiefly wooded narrow ridgetops and steep side slopes dissected by numerous short drainageways. Slope ranges from 12 to 40 percent. The Maben soils are mainly on mid and lower slopes; Smithdale soils are in all slope positions. Eroded spots, rills, and shallow gullies are in most mapped areas. A few deep gullies are in some areas. Mapped areas range from about 200 to 1000 acres in size.

The clayey Maben soils make up about 39 percent of the association. They typically have a surface layer of dark grayish brown fine sandy loam about 2 inches thick. The next layer, 2 to 4 inches thick, is yellowish brown loam. Below this, to about 35 inches, is reddish clay and

clay loam. The underlying material, to a depth of 72 inches, is stratified soft gray shale and reddish yellow loam.

The Maben soils are medium acid to very strongly acid and have a high available water capacity. Permeability is moderately slow, and runoff is rapid.

The loamy Smithdale soils make up about 32 percent of the association. They typically have a surface layer of brownish loamy sand 14 inches thick. The surface layer is underlain by yellowish red sandy clay loam that extends to a depth of about 45 inches. Between 45 and 70 inches, the soil is yellowish red sandy loam, with pockets of strong brown loamy sand.

The Smithdale soils are strongly acid or very strongly acid. The available water capacity is medium, and permeability is moderate. Runoff is rapid.

Included with these soils in mapping are a few areas of Providence and Tippah soils. Also included are well drained silty soils on ridgetops and upper slopes and well drained to somewhat poorly drained, loamy alluvial soils in small narrow bottoms.

Most areas of this association are used for trees. The potential for hay and pasture is medium. Because of steep slopes, these soils are not suited to row crops. They should be kept in trees or grasses and legumes.

This association has moderately high potential for loblolly pine and shortleaf pine. The clayey texture of the Maben soils is a moderate equipment limitation for woodland use and management.

This association has low potential for most urban uses. Slope and shrink-swell potential are the main limitation of the Maben soils. The clayey subsoil of these soils has slow percolation. All of these are limitations for septic tank absorption fields that are difficult to overcome. Selected sites can be used for dwellings and small buildings, but special design may be required to overcome the limitations.

MeB2—Memphis silt loam, 2 to 5 percent slopes, eroded. This well drained soil is on ridgetops in the western part of the county.

Typically the surface layer is dark brown silt loam about 4 inches thick. Between 4 and 21 inches, the soil is dark brown silty clay loam that is underlain, to about 60 inches, with a dark brown silt loam.

In most mapped areas the surface layer has been thinned by erosion, and in places all of the original surface has been removed. In other places the subsoil has been mixed into the plow layer. Some fields have a few rills and shallow gullies.

A few small areas of Grenada and Loring soils are included with this soil in mapping.

This soil is medium acid to very strongly acid. Water moves at a moderate rate through the subsoil. This soil has a very high available water capacity. Runoff is medium, and erosion is a hazard. The soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is deep and is easily penetrated.

This Memphis soil has high potential for row crops, grasses, and legumes. Crusting and packing are slight limitations for seedbed preparation and tilth. Such conservation management practices as returning crop residue to the soil, crop rotation, minimum tillage, contour farming, terracing, and grassed waterways help reduce runoff and control erosion.

This soil has high potential for cherrybark oak, loblolly pine, sweetgum, and water oak. It has no significant limitations for woodland use or management.

The soil has high potential for most urban uses. Low strength is a limitation but is be easily overcome through proper design and careful installation.

MeC2—Memphis silt loam, 5 to 8 percent slopes, eroded. This well drained soil occurs on ridgetops and side slopes in the western part of the county.

Typically the surface layer is dark brown silt loam about 4 inches thick. The layer between the depths of 4 and 21 inches is dark brown silty clay loam that is underlain, to a depth of about 60 inches, by dark brown silt loam.

In most fields the surface layer has been thinned by erosion. In places all of the original surface layer is missing. In other places the subsoil has been mixed into the plow layer. Some fields have a few rills and shallow gullies.

A few small areas of Loring soils are included with this soil in mapping.

This Memphis soil is medium acid to very strongly acid. Water moves through the subsoil at a moderate rate, and the available water capacity is very high. Runoff is medium, and erosion is a hazard. This soil has fair tilth and can be worked throughout a fairly wide range of moisture conditions. The root zone is deep and is easily penetrated by plant roots.

This soil has medium potential for row crops. Slope is a limitation. The soil has high potential for hay and pasture. Crusting and packing of the silty surface are slight limitations to seedbed preparation and tilth. Minimum tillage, crop rotation, contour farming, contour strip cropping, terracing, and grassed waterways are practices that help reduce runoff and control erosion.

This soil has high potential for cherrybark oak, loblolly pine, sweetgum, and water oak. It has no significant limitations for woodland use or management.

This soil has high potential for most urban uses. Low strength is the main limitation. This can be overcome by proper design and careful installation.

MeD3—Memphis silt loam, 8 to 12 percent slopes, severely eroded. This well drained soil is on side slopes.

Typically the surface layer is dark brown silt loam about 4 inches thick. The layer between the depths of 4 and 21 inches is dark brown silty clay loam. It is underlain to a depth of about 60 inches by dark brown silt loam.

In most fields the original surface layer has been removed by erosion. Eroded spots, rills, shallow gullies, and a few deep gullies are in most mapped areas.

Included with this soil in mapping are small areas of Loring soils.

This soil is medium acid to very strongly acid. Water moves at a moderate rate through the subsoil. The available water capacity is very high. Runoff is rapid, and erosion is a severe hazard. The root zone is deep and is easily penetrated by plant roots.

This soil has low potential for growing row crops because of the steep slope and the erosion hazard. It has medium potential for hay and pasture, and management concerns include proper stocking, controlled grazing, and brush and weed control.

This soil is not recommended for row crops because of the severe erosion hazard. It is better suited to trees, grasses, and legumes. When this soil is used as pasture, the gullies should be shaped and smoothed.

This soil has high potential for cherrybark oak, loblolly pine, sweetgum, and water oak. It has no significant limitations for woodland use or management.

This soil has medium potential for most urban uses. The slopes and low strength are limitations, but they may be overcome by proper design and careful installation. Steepness of slope is the main limitation for commercial buildings.

MeE2—Memphis silt loam, 12 to 20 percent slopes, eroded. This well drained soil is on side slopes in the western part of the county.

Typically the surface layer is dark brown silt loam about 4 inches thick. The layer between the depths of 4 and 21 inches is dark brown silty clay loam. It is underlain, to a depth of about 60 inches, by dark brown silt loam.

Rills and shallow gullies are common in most fields. In areas that are in pasture, tillage implements reach through the surface layer and into the subsoil. Patches of exposed subsoil are in some mapped areas.

Small areas of severely eroded soils are included with this soil in mapping.

This soil is medium acid to very strongly acid. Permeability is moderate, and the available water capacity is very high. Runoff is rapid, and erosion is a severe hazard. The root zone is deep and is easily penetrated by plant roots.

This soil has low potential for growing row crops because of the steep slope and the erosion hazard. It has medium potential for hay and pasture; management concerns include proper stocking, controlled grazing, and brush and weed control. This soil is not recommended for row crops. It should be wooded or kept in grasses and legumes.

This soil has high potential for cherrybark oak, loblolly pine, sweetgum, and water oak. It has no significant limitations for woodland use or management.

This soil has medium potential for most urban uses. The steepness of slope is the main limitation. Limitations are severe where slopes are greater than 15 percent. These may be overcome by proper design and careful installation.

Oa—Oaklimeter silt loam, occasionally flooded. This moderately well drained soil is on flood plains. Slopes are 0 to 2 percent.

Typically the surface layer is dark brown silt loam about 6 inches thick. Between depths of 6 and 27 inches is dark yellowish brown or dark brown silt loam or silt with brownish and grayish mottles. A buried solum is below this. It is light gray silt loam with brownish mottles to a depth of 52 inches. Below it, to a depth of about 70 inches, is silt loam mottled in shades of brown and gray.

Included with this soil are some small areas of Ariel, Gillsburg, and Collins soils.

This soil is strongly acid or very strongly acid. It has a high available water capacity. Permeability is moderate, and surface runoff is slow.

This soil has a high potential for growing row crops, pasture, and hay. It is well suited to cotton, soybeans, corn, grasses, and legumes. Return of crop residue helps maintain good tilth. Row arrangement and field ditches are needed to help remove excessive surface water.

This soil has a very high potential for growing cherrybark oak, eastern cottonwood, green ash, loblolly pine, nuttall oak, willow oak, and sweetgum. There are no significant limitations for woodland use or management.

This soil has a low potential for urban uses because of the flood hazard.

Ok—Oaklimeter silt loam, frequently flooded. This moderately well drained soil occurs on flood plains that are subject to flooding when the reservoirs are at high water stages. Slopes are 0 to 2 percent.

Typically the surface layer is dark brown silt loam about 6 inches thick. Between depths of 6 and 27 inches is dark yellowish brown or dark brown silt loam or silt with brownish and grayish mottles. A buried solum is below this. It is light gray silt loam with brownish mottles to a depth of 52 inches. Below it, to a depth of about 70 inches, is silt loam mottled in shades of brown and gray.

Included with this soil are some small areas of Ariel, Gillsburg, and Collins.

This soil is strongly acid or very strongly acid. It has a high available water capacity. Permeability is moderate, and surface runoff is slow.

This soil has a low potential for growing row crops. It floods frequently and floods may last several weeks in winter and spring. Choice of plants is limited. A few areas are planted to soybeans in late spring. In some years crops cannot be planted, or they receive major damage from flooding.

This soil has a medium potential for pasture and hayland. It is suited to most grasses and legumes, but grazing in winter and early spring is limited because of flooding and wetness.

This soil has a very high potential for growing cherrybark oak, eastern cottonwood, green ash, loblolly pine, nuttall oak, willow oak, and sweetgum. Severe equipment limitations because of wetness and flooding restrict management and harvesting to the drier seasons.

Potential for urban uses of this soil is low because of the flood hazard.

PG—Pits. This unit consists of gravel pits, sand pits, and borrow pits. The gravel pits are in the western part of the county. They are in the Citronelle geologic formation which underlies the loess. The pits are open excavations from which gravel and sand have been removed. Depth to the gravel ranges from about 5 to 20 or more feet. Thickness of the gravel strata ranges to several feet. The pits range up to about 150 acres in size.

Sand pits are areas from which sand only has been removed. These are mainly in the eastern part of the county in areas of Smithdale soils. Borrow pits are areas from which soil and underlying materials have been removed for use in construction of roads and dams.

The open pits expose material that supports low quality grass and trees. Most plants are of little economic value, except as an erosion control measure. Many areas are left bare. These areas have low potential for crops, pasture, woodland, and urban uses.

PrB2—Providence silt loam, 2 to 5 percent slopes, eroded. This moderately well drained soil is on broad ridgetops. Slopes are smooth and convex.

Typically the surface layer is a dark brown silt loam about 2 inches thick. The 2 to 19 inches layer is dark brown silty clay loam. A brownish fragipan that has grayish mottles and is firm, brittle, and compact is below this layer to a depth of about 54 inches. The lower part of the fragipan has a high sand content. The underlying material, to a depth of about 80 inches, is strong brown sandy loam.

In most fields the surface layer has been thinned by erosion, and eroded spots are present where the original surface is gone or where the subsoil is mixed into the plow layer. Some fields have rills and shallow gullies.

Included in the mapping are a few small areas of Loring soils.

This soil is medium acid to very strongly acid. Permeability is moderate above the fragipan and moderately slow in the fragipan. The available water capacity is medium. Seedbed preparation and tilth are a slight problem because of crusting and packing of the soil. The root zone is moderately deep, and roots easily penetrate it to the fragipan. The fragipan perches water during wet seasons.

This soil is in about equal proportions of cropland, pasture, and woodland. It has a high potential for growing row crops, pasture, and hay. Cotton, corn, soybeans, small grains, grasses, and legumes are well suited. Soil erosion is a hazard on cropland but can be controlled by return of crop residue, minimum tillage, contour farming, terracing, and use of grassed waterways.

This soil has a moderately high potential for growing loblolly pine, shortleaf pine, sweetgum, Shumard oak, and yellow-poplar. There are no significant limitations for woodland use or management.

This soil has a high potential for most urban uses. Low strength is the major limitation, but it can be easily overcome by proper design and careful installation. The lower part of the subsoil percolates slowly and is limited for septic tank absorption fields. This limitation can be partially overcome by increasing the size of the absorption area or by modifying the filter field itself.

PrC2—Providence silt loam, 5 to 8 percent slopes, eroded. This moderately well drained soil is on upper side slopes and ridgetops. The slopes are smooth and convex.

Typically the surface layer is dark brown silt loam about 2 inches thick. The 2 to 19 inch layer is dark brown silty clay loam. A brownish fragipan that has grayish mottles and is firm, brittle, and compact is below this layer to a depth of about 54 inches. The lower part of the fragipan has a high sand content. The underlying material, to a depth of about 80 inches, is strong brown sandy loam.

In most fields the surface layer has been thinned by erosion, and spots are present where the original surface is gone or where the subsoil is mixed into the plow layer. Some fields have rills and shallow gullies.

Included in mapping are a few areas where the soil is severely eroded and a few where it is slightly eroded. A few small areas of Loring soils are also included.

This soil is medium acid to very strongly acid. Permeability is moderate above the fragipan and moderately slow in the fragipan. The available water capacity is medium. Runoff is medium. The root zone is moderately deep and easily penetrated by plant roots to the fragipan. The fragipan perches water during wet seasons.

This soil is mostly in pasture and woodland; the other areas are in row crops. It has a medium potential for growing row crops such as cotton, corn, and soybeans. Erosion is a hazard when the soil is used for cropland. It can be controlled by using minimum tillage, stripcropping, contour farming, terracing, and using grassed waterways. Return of crop residue helps maintain tilth.

This soil has high potential for pasture and hayland. It is suited to all the commonly grown grasses and legumes.

This soil has a moderately high potential for growing loblolly pine, shortleaf pine, sweetgum, Shumard oak, and yellow-poplar. There are no significant limitations for woodland use and management.

This soil has a high potential for most urban uses. Low strength is the major limitation, but it can be easily overcome by proper design and careful installation. The lower part of the subsoil percolates slowly and is limited for septic tank absorption fields. This limitation can be partially overcome by increasing the size of the absorption area or by modifying the filter field itself.

PrE2—Providence silt loam, 8 to 15 percent slopes, eroded. This moderately well drained soil is on side slopes.

Typically the surface layer is dark brown silt loam about 2 inches thick. The 2 to 19 inch layer is dark brown silty clay loam. A brownish fragipan that has grayish mottles and is firm, brittle, and compact is below this layer to a depth of about 54 inches. The lower part of the fragipan has a high sand content. The underlying material, to a depth of about 80 inches, is strong brown sandy loam.

The original surface layer in most areas has been thinned by erosion. Rills and shallow gullies are common. Included in the mapped areas are a few areas where slope is greater than 15 percent and a few areas where erosion is severe. In some areas the soil does not have a fragipan. Also included are a few small areas of Loring and Smithdale soils.

This soil is medium acid to very strongly acid. Permeability is moderate above the fragipan and moderately slow in the fragipan. The available water capacity is medium. Runoff is rapid. The root zone is moderately deep and can be easily penetrated by plant roots.

Because of slope and the erosion hazard, this soil has a low potential for growing crops. It has a high potential for growing pasture and hay crops, such as improved bermudagrass and bahiagrass.

This soil has a moderately high potential for growing loblolly pine, shortleaf pine, sweetgum, Shumard oak, and yellow- poplar. There are no significant limitations for woodland use and management.

This soil has a medium potential for most urban uses. Low strength and slope are limitations which require special design and careful installation procedures. The lower part of the subsoil percolates slowly, and is limited for septic tank absorption fields. This limitation can be partially overcome by increasing the size of the absorption area and putting trenches on the contour.

PrE3—Providence silt loam, 8 to 15 percent slopes, severely eroded. This moderately well drained soil is on side slopes.

Typically the surface layer is dark brown silt loam about 2 inches thick. The 2 to 19 inch layer is dark brown silty clay loam. A brownish fragipan that has grayish mottles and is firm, brittle, and compact is below this layer to a depth of about 54 inches. The lower part of the fragipan has a high sand content. The underlying material to about 80 inches is strong brown sandy loam.

The original surface layer in most fields has been removed by erosion. Many eroded spots, rills, shallow gullies, and a few deep gullies are in most delineations. Included in mapping are a few small areas where the soil is eroded. Some areas of soil similar to Providence, but without a fragipan are included. A few small areas of Loring and Smithdale soils are in some delineations. Also included are a few areas where slopes are greater than 15 percent.

This soil is medium acid to very strongly acid. Permeability is moderate above the fragipan and moderately slow in the fragipan. Because much of the upper part of this soil has been removed by erosion, the available water capacity is medium. Runoff is rapid.

Because of slope and the severe erosion hazard, this soil has a low potential for row crops. It has a medium potential for growing pasture and hay. Improved bermudagrass and bahiagrass are plants that are suited. When used for pasture, the gullies should be shaped and smoothed.

This soil has a moderately high potential for growing loblolly pine, shortleaf pine, sweetgum, Shumard oak, and yellow-poplar. There are no significant limitations for woodland use and management.

This soil has a medium potential for most urban uses. Low strength and slope are limitations which require special design and careful installation to overcome. The moderately slow percolation and steep slopes are limitations for septic tank absorption fields. They also require special design, such as increasing the size of the absorption area and locating trenches on the contour.

PvD3—Providence-Smithdale complex, 8 to 12 percent slopes, severely eroded. This complex consists of areas of Providence and Smithdale soils that are so intermingled and change within such short distances that it is not practical to map them separately at the scale selected for mapping. The landscape is dissected by short drains and narrow ridgetops. Size of the areas ranges from about 20 to 100 acres. The Providence soils dominate the mapped areas. Smithdale soils occur as outcrops of about 1 to 5 acres and are generally on mid and lower slopes.

The moderately well drained Providence soils make up about 42 percent of the mapped area. Typically the surface layer is a dark brown silt loam about 2 inches thick. The 2 to 19 inch layer is a dark brown silty clay loam. A brownish fragipan that has grayish mottles and is firm, brittle, and compact is below this layer to a depth of about 54 inches. The lower part of the fragipan has a high sand content. The underlying material, to a depth of about 80 inches, is a strong brown sandy loam.

The Providence soils are medium acid to very strongly acid. Permeability is moderate above the fragipan and moderately slow in the fragipan. Because of the removal of much of the upper part of this soil by erosion, the available water capacity for this mapping unit is medium. Runoff is rapid.

Smithdale soils make up about 27 percent of the mapped areas. Typically the surface layer is brownish loamy sand 14 inches thick and is underlain by a yellowish red sandy clay loam to a depth of about 45 inches. The 45 to 70 inch layer is a yellowish red sandy loam with pockets of strong brown loamy sand.

The Smithdale soils are strongly acid or very strongly acid. The available water capacity is medium, and permeability is moderate. Runoff is rapid.

The original surface layer in most fields of this complex has been removed by erosion. Many eroded spots, rills, shallow gullies, and a few deep gullies are in most delineations. Included in mapping are a few areas of soils similar to Providence without fragipans and a few soils similar to Smithdale except they are more clayey in the lower subsoil. Also included are a few small areas where slopes are greater than 12 percent and a few small patches that are gullied.

This complex has a low potential for growing row crops because of the slope and severe erosion. It has a medium potential for pasture and hayland. It is suited for grasses, such as improved bermuda and bahia.

This soil has a moderately high potential for growing loblolly pine, shortleaf pine, sweetgum, shumard oak, and yellow-poplar. There are no significant limitations for woodland use and management.

This soil has a medium potential for most urban uses. Slope and low strength are limitations but they can be overcome by proper design and careful installation procedures. In addition, the slow percolation of Providence soils is a limitation for septic tank absorption fields. This can be partially overcome by increasing the size of the absorption area or by modifying the filter field itself.

SdE2—Smithdale-Providence complex, 12 to 25 percent slopes, eroded. This complex consists of areas of Smithdale and Providence soils too intermingled to be separated at the scale selected for mapping. It occurs on slopes that are dissected by short drainageways and narrow ridgetops. Size of the areas ranges from about 20 acres to more than 200 acres. Smithdale soils are generally on the steeper side slopes and Providence soils on the narrow ridgetops. In most fields the surface has been thinned by erosion, and eroded spots are present where the original surface is gone or where the subsoil is mixed into the plow layer. In some fields the subsoil is exposed because of the clearing of timber or the smoothing of shallow gullies present in some areas.

The well drained Smithdale soils make up about 71 percent of this complex. Typically, the surface layer is brownish loamy sand 14 inches thick and is underlain by yellowish red sandy clay loam to a depth of about 45 inches. The 45 to 70 inch layer is a yellowish red sandy loam with pockets of strong brown loamy sand.

The Smithdale soils are strongly acid or very strongly acid. The available water capacity is medium, and permeability is moderate. Runoff is rapid.

The moderately well drained Providence soils make up about 26 percent of this complex. Typically the surface layer is brown silt loam about 2 inches thick. The 2 to 19 inch layer is dark brown silty clay loam. A brownish fragipan that has grayish mottles and is firm, brittle, and compact is below this layer to a depth of about 54 inches. The lower part of the fragipan has a high sand content and the underlying material, to a depth of about 80 inches, is strong brown sandy loam.

The Providence soils are medium acid to very strongly acid. Permeability is moderate above the fragipan and moderately slow in the fragipan. The available water capacity is medium.

Some areas of soils similar to Smithdale and Providence are included in mapping. A few small areas of Maben soils are also included.

The steep slopes and severe erosion hazard give this complex a low potential for growing row crops. Most of this complex is used for pasture. It has a medium potential for bermudagrass and bahiagrass. A high level of management is needed to produce moderate yields.

This complex has a moderately high potential for growing loblolly pine and shortleaf pine. There are no significant limitations for woodland use and management.

This complex has a low potential for most urban uses. The steep slopes are a limitation which is difficult to overcome, but with special design and careful installation procedures many areas within the complex can be used for this purpose.

SmE—Smithdale-Udorthents complex, gullied. This complex occurs throughout the county. It consists of very severely eroded soils in gullied areas and narrow ridges of Smithdale soils between the gullies. The soils occur in too intricate a pattern to be mapped separately at the field scale. Slopes are 5 to 25 percent.

The well drained Smithdale soils make up about 16 percent of the complex and occur on all slope positions. They occupy the narrow fingers between gullies and the rim around them.

Typically the surface layer is brownish loamy sand 14 inches thick and is underlain by yellowish red sandy clay loam to about 45 inches. The 45 to 70 inch layer is a yellowish red sandy loam with pockets of strong brown loamy sand.

Smithdale soils are strongly acid or very strongly acid. The available water capacity is medium, and permeability is moderate. Runoff is rapid.

The soils in the gullied areas are loamy with a high amount of sand. Many of the wider gullies have flat bottoms in which there are thinly stratified accumulations of sand and silt. The accumulations range to about 40 inches in depth. These have been classified as Udorthents at the great group level. The soils in the gully floors have stabilized and have a moderate site index for pine trees. The gully walls, which range from 2 to 30 feet in height, are almost vertical and many remain bare. Other gullies which form a V-shape have less accumulation on the floor and generally have more gently sloping walls. The gully walls and other areas of little or no accumulation have a low site index for trees. Udorthents are strongly acid or very strongly acid. The available water capacity and permeability are variable. Surface runoff is rapid.

This complex is about 14 percent Providence soil that occurs with the Smithdale soil and is generally near the upper part of the slopes.

This complex has a low potential for row crops and pasture. It has a medium potential for loblolly pine and shortleaf pine (fig. 3). There are severe limitations for woodland use and management. Seedlings have a high mortality rate. Special equipment may be needed for harvesting due to the steepness of gully walls.

This complex has a low potential for urban uses because of the severe erosion and gullies.

STF—Smithdale-Providence association, hilly. This mapping unit consists of well drained and moderately well drained hilly soils that occur in a regular and repeating pattern. The landscape is chiefly wooded and has narrow ridgetops and side slopes, dissected by numerous short drains. The Smithdale soils are on the mid and lower side slopes. The Providence soils are mainly on the narrow ridgetops. Smithdale soils formed in loamy material high in content of sand, and Providence soils formed in silty material over loamy material. Slopes are 12 to 40 percent.

The well drained Smithdale soils make up about 54 percent of the association. Typically the surface layer is brownish loamy sand 14 inches thick and is underlain by a yellowish red sandy clay loam to a depth of about 45 inches. The 45 to 70 inch layer is a yellowish red sandy loam with pockets of strong brown loamy sand.

The Smithdale soils are strongly acid or very strongly acid. The available water capacity is medium, and permeability is moderate. Runoff is rapid.

The moderately well drained Providence soils make up about 32 percent of the association. Typically the surface layer is dark brown silt loam about 2 inches thick. The 2 to 19 inch layer is dark brown silty clay loam. A brownish fragipan that has grayish mottles and is firm, brittle, and compact is below this layer to a depth of about 54 inches. The lower part of the fragipan has a high sand content. The underlying material to about 80 inches is strong brown sandy loam.

The Providence soils are medium acid to very strongly acid. Permeability is moderate above the fragipan and moderately slow in the fragipan. The available water capacity is medium. Runoff is rapid.

Included in mapping are small areas of clayey Maben soils. These occur as small outcrops generally on lower slopes. Also included are small, narrow bottoms, too small to delineate, of Bruno, Collins, and Gillsburg soils. In some areas of this association, sandstone fragments occur on and in the Smithdale soils. They range in size from pebbles to boulders a few feet across.

Almost all of this association is wooded. Potential for row crops is low. These soils are better suited to trees than to other uses, but with careful management can be pastured in those areas where slope is less than about 17 percent. Soils in these areas have a medium potential for growing improved bermudagrass. The erosion hazard is very severe in cleared areas.

This association has a medium high potential for growing loblolly pine and shortleaf pine. There are no significant limitations for woodland use and management.

This association has a low potential for most urban uses. Steep slopes are a severe limitation which is difficult to overcome; however, areas can be selected where soils have slight limitations for many uses.

TaC2—Tippah silt loam, 5 to 8 percent slopes, eroded. This is a moderately well drained soil on ridgetops and side slopes.

Typically the surface layer is a yellowish brown silt loam about 6 inches thick and is underlain by a strong brown silty clay loam and silt loam to a depth of 35 inches. Grayish mottles are below a depth of about 21 inches. The 35 to 52 inch layer is a firm, plastic, and sticky yellowish red clay with gray mottles. Below this to a depth of 72 inches, is firm, plastic, and sticky silty clay loam or silty clay mottled in shades of gray, brown, and red.

The original surface layer in most fields has been removed by erosion. Eroded spots, rills, and shallow gullies are in most delineations.

A few small areas of Providence and Sweatman soils are included in the mapping.

This soil is medium acid to very strongly acid. Permeability is slow, and the available water capacity is high. Runoff is medium, and erosion is a hazard. The root zone is deep and easily penetrated by plant roots.

This soil has medium potential for growing row crops. Conservation practices, such as return of crop residue, minimum tillage, crop rotations, stripcropping, contour farming, terracing, and grassed waterways help control erosion.

This soil has a high potential for growing pasture and hay crops. It is suited to the commonly grown grasses and legumes.

This soil has moderately high potential for growing cherrybark oak, Shumard oak, white oak, loblolly pine, sweetgum, and yellow-poplar. There are no significant limitations for woodland use or management.

This soil has low potential for most urban uses. Shrink-swell potential and low strength are the main limitations. They may be overcome by careful design and installation procedures. This soil percolates slowly and is severely limited for septic tank absorption fields.

TpD2—Tippah-Maben complex, 8 to 12 percent slopes, eroded. This complex consists of areas of Tippah and Maben soils too intermingled to be separated at the scale selected for mapping. This is a complex that is dissected by short drainageways and narrow ridgetops. Tippah soils generally occur on mid and upper slopes, and Maben soils extend from mid slopes to lower slopes. In most delineations the surface layer has been thinned by erosion, and eroded spots are present where the original surface is gone or where the subsoil is mixed with the surface layer. Rills and shallow gullies are common. Size of the delineations is about 20 to 150 acres.

The moderately well drained Tippah soils make up about 59 percent of this complex. Typically the surface layer is yellowish brown silt loam about 6 inches thick and is underlain by a strong brown silty clay loam and silt loam to a depth of 35 inches. Grayish mottles are below a depth of about 21 inches. The 35 to 52 inch layer is a firm, plastic, and sticky yellowish red clay with gray mottles. Below this, to a depth of 72 inches, is firm, plastic, and sticky silty clay loam or silty clay mottled in shades of gray, brown, and red.

The Tippah soils are medium acid to very strongly acid. The available water capacity is high. Permeability is slow, and runoff is rapid.

The well drained Maben soils make up about 22 percent of this complex. Typically the surface layer is a dark grayish brown sandy loam about 2 inches thick. The 2 to 4 inch layer is yellowish brown loam. Below this, to a depth of about 35 inches is reddish clay and clay loam. The underlying material to a depth of 72 inches is stratified layers of soft gray shale and reddish yellow loam.

The Maben soils are medium acid to very strongly acid. The available water capacity is high. Permeability is moderately slow, and runoff is rapid.

Included in mapping are a few areas of well drained and moderately well drained loamy soils and severely eroded soils. Also included are small areas of Providence soils.

This complex has a low potential for row crops and for urban uses. Steepness of slope and shrink-swell potential are the main limitations.

This complex has a moderately high potential for growing loblolly pine, shortleaf pine, cherrybark oak, Shumard oak, white oak, sweetgum, and yellow-poplar. There are no significant limitations for woodland use and management.

Use and Management of the Soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, woodland, and as sites for buildings, highways and other transportation systems, sanitary facilities, parks and other recreation facilities, and wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and Pasture

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the needed management practices. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil Maps for Detailed Planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

More than 116,000 acres in the survey area was used for crops and pasture in 1967, according to the Conservation Needs Inventory. Of this total, 53,000 acres was used for permanent pasture; 64,000 acres for row crops, mainly cotton and soybeans; 551 acres for close-grown crops, mainly wheat and oats; 3,781 acres for rotation hay and pasture. The rest was idle cropland.

The potential of the soils in Yalobusha County for increased production of food and fiber is good. About 9,000 acres of potentially good cropland is currently used as woodland and about 16,000 acres as pasture. In addition to the reserve productive capacity represented by this land, production could also be increased considerably by extending the latest crop production technology to all cropland in the county. This soil survey can greatly facilitate the application of such technology.

Acreage in crops, mainly soybeans, has increased slightly the last several years and pasture acreage has remained almost stable. Potentials and limitations for specific uses of the land are discussed in the section "Soil Map for General Planning."

Soil erosion is the major concern on more than two-thirds of the land in Yalobusha County. If the slope is more than 2 percent, erosion is a hazard. Grenada and Providence soils, for example, have slopes of 2 to 5 percent and an additional problem of wetness.

Loss of the surface layer through erosion is damaging for two reasons: first, productivity is reduced as the surface layer is lost and part of the susoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils with a clayey subsoil, such as the Tippah soils, and on soils with a layer in or below the subsoil that limits the depth of the root zone. Such layers include

fragipans, as in Loring and Providence soils, or shale, as in Maben soils. Erosion also reduces productivity on soils that tend to be droughty, such as the Smithdale soils. Second, soil erosion on farmland results in sediment entering streams. Control of erosion minimizes the pollution of streams by sediment and improves quality of water for municipal use, for recreation, and for fish and wildlife.

In many sloping fields, preparing a good seedbed and tilling are difficult on clayey or hardpan spots because the original friable surface soil has eroded away. Such spots are common in areas of moderately eroded Tippah and Loring soils.

Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps vegetative cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legume and grass forage crops in a cropping system reduce erosion on sloping land and also provides nitrogen and improves tilth for the following crop.

Cropping systems that provide substantial vegetative cover are required to control erosion on sloping soils unless minimum tillage is practiced. Minimizing tillage and leaving crop residue on the surface help to increase infiltration and reduce the hazard of runoff and erosion. These practices can be adapted to most soils in the survey area, but they are more difficult to use successfully on the eroded soils. No tillage for soybeans, which is common on an increasing acreage, is effective in reducing erosion on sloping land and can be adapted to most soil in the survey area (fig. 4).

Terraces and diversions reduce the length of slope and reduce runoff and erosion. They are most practical on deep, well drained soils that have regular slopes. Loring and Memphis soils are generally suitable for terraces. Some soils are less suitable for terracing and diversions because of irregular or steep slopes.

Contouring and contour stripcropping are erosion control practices that can be used in the survey area. They are best adapted to soils with smooth, uniform slopes, including most areas of the sloping Grenada, Loring, and Memphis soils.

Information for the design of erosion control practices for each kind of soil is contained in the "Technical Guide," available in local offices of the Soil Conservation Service.

Soil drainage is the major management need on about one-third of the acreage used for crops and pasture in the survey area. All of the soils on flood plains need artificial drainage to achieve maximum production. In this category are the Ariel, Arkabutla, Bruno, Cascilla, Collins, Gillsburg, and Oaklimeter soils. These soils account for about 65,000 acres in Yalobusha County. The principal cropland of the county is in areas of these soils.

Grenada and Calloway soils are on uplands in broad areas where slope is nearly level. They require artificial drainage to achieve maximum production.

The design of drainage systems varies with the kind of soil, slope, size of area to be drained, and vegetation. Information on drainage design for each kind of soil is contained in the "Technical Guide" available in local offices of the Soil Conservation Service.

Soil fertility is naturally low in most soils of the uplands in the survey area. All but Bonn and Deerford soils are naturally acid. The soils on flood plains, such as Collins and Oaklimeter, range from very strongly acid to strongly acid and are naturally higher in plant nutrients than most upland soils.

Many upland soils are naturally very strongly acid, and if they have never been limed they require applications of ground limestone to raise the pH level sufficiently for good growth of crops and pasture. Available phosphorus and potash levels are naturally low in most of these soils. On all soils additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Soil tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth are granular and porous.

Most of the soils used for crops in the survey area have a silt loam surface layer that is light in color and low in content of organic matter. Generally the structure of such soils is weak, and intense rainfall causes the formation of crust on the surface. The crust is hard when it is dry, and it is nearly impervious to water. Once the crust forms, it reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material help to improve soil structure and to reduce crust formation.

Fall plowing is generally not a good practice on the light-colored soils that have a silt loam surface layer because of the crust that forms during the winter and spring. Many of the soils are nearly as dense and hard at planting time after fall plowing as they were before they were plowed. Also, much of the cropland consists of sloping soils that are subject to damaging erosion if they are plowed in the fall.

Field crops suited to the soils and climate of the survey area include many that are not now commonly grown. Cotton, corn, and soybeans are the row crops. Alfalfa, sorghum, millet, sunflowers, cowpeas, field beans, peanuts, potatoes, and similar crops can be grown if economic conditions are favorable.

Wheat and oats are the common close-growing crops. Rye and barley could be grown and grass seed could be produced from fescue and bahiagrass. The row crops are best suited to the occasionally flooded phases of Arkabutla, Cascilla, Collins, Oaklimeter, and Gillsburg soils and the nearly level to sloping areas of Calloway, Loring, Memphis, and Providence soils. The close-growing crops are suited to these soils and can be grown on steeper slopes of these and other soils.

Special crops grown commercially in the survey area are vegetables, small fruits, tree fruits, and nursery plants. A small acreage throughout the county is used for melons, strawberries, sweet corn, tomatoes, and other vegetables and small fruits. In addition, areas can be adapted to other special crops such as cucumbers, okra, and peppers. Pecans and peaches are the most important tree fruits grown in the county.

Deep soils that have good natural drainage and that warm up early in spring are especially well suited to many vegetables. In the survey area these are Cascilla, Collins, and Oaklimeter soils on flood plains and the nearly level to sloping areas of Grenada, Loring, Memphis, and Providence soils on uplands. Fruits, such as peaches and pears, are best suited to the deep well drained Memphis and Smithdale soils, except on the steeper areas that are more susceptible to erosion.

In addition to the crops mentioned above, many kinds of plants are grown on an experimental basis at the Soil Conservation Service Plant Materials Center in Yalobusha County to determine their suitability for the area.

Latest information and suggestions for growing special crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Capability Classes and Subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs. A survey area may not have soils of all classes *(10)*.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use; they are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

Capability units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is the list that follows. All soils in the survey area except those named at a level higher than the series are included. Some of the soils that are well suited to crops and pasture, for example, soils in capability classes I and II, may be in low-intensity use. Data in this list can be used to determine the farming potential of such soils.

Capability Units and Soil Acreage

Unit IIe-1 consists of gently sloping, well drained, silty soil of the uplands; MeB2; 400 acres.

Unit IIe-2 consists of gently sloping, moderately well drained silty soils of the uplands; GrB, LoB2, PrB2; 9,825 acres.

Total acres of soils in capability subclass IIe: 10,225

Unit IIw-1 consists of nearly level, moderately well drained silty soils of the uplands; GrA; 2,215 acres.

Unit IIw-2 consists of nearly level, moderately well and well drained acid soils of the flood plains; Ae, Cc, Cn, Oa; 43,925 acres.

Unit IIw-3 consists of nearly level, somewhat poorly drained soils of the uplands; CaA; 3,325 acres.

Unit IIw-4 consists of nearly level, somewhat poorly drained acid soils of the flood plains; Ar, Ga; 9,530 acres.

Total acres of soils in capability subclass IIw: 58,995; total acres of soils in Class II: 69,220.

Unit IIIe-1 consists of sloping, well drained silty soils of the uplands; MeC2; 1,840 acres.

Unit IIIe-2 consists of sloping, moderately well drained silty soils of the uplands; LoC2, PrC2, TaC2; 11,740 acres.

Total acres of soils in capability subclass IIIe: 13,580.

Unit IIIw-1 consists of nearly level, somewhat poorly drained soils high in sodium on uplands; De; 665 acres.

Total acres in subclass IIIw; 665.

Unit IIIs-1 consists of nearly level, excessively drained sandy soils of the flood plains; Br; 1,250 acres.

Total acres in capability subclass IIIs: 1,250; Total acres in Class III: 15,495.

Unit IVe-1 consists of sloping severely eroded, and strongly sloping eroded, moderately well drained silty soils of the uplands; LoC3, LoD2, TpD2; 8,445 acres.

Total acres in capability subclass IVe: 8,445

Unit IVw-1 consists of nearly level, moderately well and well drained, frequently flooded soils on flood plains; Cd, Ca, Ok; 3,335 acres.

Unit IVw-2 consists of nearly level, somewhat poorly drained, frequently flooded soils on flood plains; Au, Gb; 1,720 acres.

Total acres of soils in capability subclass IVw: 5,055.

Unit IVs-1 consists of nearly level, poorly drained soils that have a high content of sodium, on uplands and terraces; Bo; 965 acres.

Total acres in capability subclass IVs: 965; Total acres in Class IV; 14,465.

Unit Vw-1 consists of nearly level, excessively dained, frequently flooded soils on flood plains; Bu; 130 acres.

Total acres in Class V 130.

Unit VIe-1 consists of well drained and moderately well drained, strongly sloping to steep silty soils of uplands; MeE2, PrE2; 6,480 acres.

Unit VIe-2 consists of well drained and moderately well drained, strongly sloping to moderately steep, severely eroded silty soils of the uplands; LoD3, MeD3, PrE3, PvD3; 25,655 acres.

Total acres in capability subclass VIe and class VI: 32,135.

Unit VIIe-1 consists of moderately steep to steep, slightly to severely eroded loamy soils of the uplands; SdE2, STF; 137,420 acres.

Unit VIIe-2 consists of moderately steep and steep, well drained clayey soils of the uplands; MAE; 15,880 acres.

Unit VIIe-3 consists of severely gullied loamy soils of the uplands; SmE; 10,800 acres.

Unit VIIe-4 consists of severely gullied silty soils of the uplands; LrE; 3,280 acres.

Total acres in capability subclass VIIe and Class VII: 167,380.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil or that a given crop is not commonly irrigated.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes climatically suited to the area and the soil. A few farmers may be obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Woodland Management and Productivity

Joseph V. Zary, forester, Soil Conservation Service, assisted in preparing this section.

In addition to being a reservoir for moisture for a tree, soil provides all the essential elements required for growth except carbon and oxygen, which are derived from the atmosphere. Soil also provides the medium in which a tree is anchored. The many characteristics of soil, such as chemical composition, texture, structure, depth, and position, affect the growth of a tree. A number of

studies have shown strong correlations between productivity of site, or growth of trees, and various soil characteristics, such as depth and position of slope. The relationships are often indirect. The water and nutrient supplying ability of a soil is strongly related to its texture and structure, as well as to its depth. Coarse textured soils, or sands, are low in nutrient content and available water capacity. Aeration is impeded in heavy clays, particularly under wet conditions, so that metabolic processes requiring oxygen in the roots are inhibited. In clay soils percolation of water into the soil and aeration are favored by aggregated soil particles. Silvicultural practices that prevent the destruction of organic matter and the compaction of soil provide for better conditions of soil moisture and aeration (*11*).

Practically all of Yalobusha County is well suited for the production of timber products. Most soils are deep and medium textured. This, with an adequate moisture supply, provides a good medium for tree growth.

Approximately 50 percent of the county is wooded (*4*). About 7 percent is in the Holly Springs National Forest. Major timber companies also have large tracts. In 1973 the growing stock in Yalobusha County was 56.9 million cubic feet of pine and 54 million cubic feet of hardwoods (*4*). The forests of Yalobusha County can be divided into four major types. Forest type is determined by the predominant species as indicated by cubic volume for sawtimber and poletimber stands and number of trees for seedling-sapling stands (*8*).

The oak-hickory forest is characterized by forest in which 50 percent or more of the stand is upland oaks or hickory and less than 25 percent is pine. Common associates include yellow-poplar, elm, maple, and black walnut. This type of forest occurs on soils such as Memphis and Loring and occupies the northwestern third of Yalobusha County.

The oak-pine forest is characterized by forest in which 50 percent or more of the stand is hardwoods, usually upland oaks, but in which southern pines make up 25 to 49 percent of the stand. Common associates include gum, hickory, and yellow-poplar. This forest type occurs on soils such as Loring, Providence, and Smithdale and covers most of the southeastern two-thirds of Yalobusha County.

The oak-gum-cypress forest is on bottom land in which 50 percent or more of the stand is tupelo, blackgum, sweetgum, oak, or southern cypress and less than 25 percent is pines. Common associates include cottonwood, willow, ash, elm, hackberry, and maple. This forest type occurs on soils such as Collins, Gillsburg, and Oaklimeter in bottom lands chiefly along Skuna and Yacona Rivers, Turkey Creek, and their tributaries.

The loblolly-shortleaf pine forest is one in which 50 percent or more of the stand is loblolly pine, shortleaf pine, or other southern yellow pine. Common associates include oak, hickory, and gum. This forest type occurs on soils such as Maben and Smithdale, and only a small area is in the southeast corner of Yalobusha County.

Table 6 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Mapping unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity (*7*, *12*).

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, t, d, c, s, f, and r.

The third element in the symbol indicates the degree of hazards of limitations and the general suitability of the soils for certain kinds of trees. The three management problems considered here are: (1) erosion hazard, (2) equipment restrictions, and (3) seedling mortality.

The numeral 1 indicates that soils have slight or no management problems and are best suited to needle leaf trees.

The numeral 2 indicates that soils have one or more moderate management problems and are best suited to needleleaf trees.

The numeral 3 indicates that soils have one or more moderate management problems and are best suited to needleleaf trees (fig. 5).

The numeral 4 indicates that soils have slight or no management problems and are best suited to broadleaf trees.

The numeral 5 indicates that soils have one or more moderate management problems and are best suited to broadleaf trees.

The numeral 6 indicates that soils have one or more severe management problems and are best suited to broadleaf trees.

The numeral 7 indicates that soils have slight or no management problems and are suitable for either needleleaf or broadleaf trees.

The numeral 8 indicates that soils have one or more moderate management problems and are suitable for either needleleaf or broadleaf trees.

The numeral 9 indicates that soils have one or more severe management problems but are suitable for either needleleaf or broadleaf trees.

The numeral 0 indicates that soils are not suitable for the production of major commercial wood products.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well-managed woodland. The risk is *slight* if the

expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil (fig. 6).

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings when plant competition is not a limiting factor. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade or grow if openings are made in the tree canopy. The invading plants compete with native plants or planted seedlings by impeding or preventing their growth. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* means that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

The *potential productivity* of merchantable or *important trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Important trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Engineering

BOBBY F. PIERCE, engineer, Soil Conservation Service, assisted in preparing this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this section are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil Properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to: (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the

need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 7 shows, for each kind of soil, the degree and kind of limitations for building site development; table 8, for sanitary facilities; and table 10, for water management. Table 9 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building Site Development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 7. A *slight* limitation indicates that soil properties are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are used for pipelines, sewerlines, telephone and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by the soil wetness of a high seasonal water table, the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is defined, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 7 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious limitation.

Local roads and streets referred to in table 7 have an all-weather surface that can carry light to medium traffic all year. They consist of subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Sanitary Facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 8 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope may cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table could be installed or the size of the absorption field could be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soils affect the performance of embankments.

Sanitary landfill provides a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with thin layers of soil. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness may be a limitation because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

In the trench type of landfill, ease of excavation also affects the suitability of a soil for this purpose, so the soil must be deep to bedrock and free of large stones and boulders. Where the seasonal water table is high, water seeps into trenches and causes problems in filling.

Unless otherwise stated, the limitations in table 8 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry weather. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Soil suitability is rated by the terms *good*, *fair*, and *poor*, which have, respectively, meaning approximately parallel to the terms *slight*, *moderate*, and *severe*.

Construction Materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 9 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 13 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few

cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 9 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 13.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slopes, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water Management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 10 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Drainage of soil is affected by such soil properties as permeability, texture, depth to bedrock, hardpan, or other layers that affect the rate of water movement, depth to the water table, slope, stability of ditchbanks, susceptibility to flooding, salinity and alkalinity, and availability of outlets for drainage (fig. 7).

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, presence of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping (fig. 8).

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

Yalobusha County has considerable potential for year-round outdoor recreation because of favorable climate and location. Much of the county, including Enid and Grenada Reservoirs, are readily accessible from Interstate Highway 55, a major tourist route.

Yalobusha County provides recreational activities for many people from surrounding urban and metropolitan areas such as Memphis, Tennessee, which is only a two-hour drive away. Enid and Grenada Reservoirs have several thousand acres of open water that is ideal for boating, fishing, swimming, and water skiing. Several areas around the lakes have been developed into parks and places for picnicking and camping. Many other areas have potential for this type of development throughout the county. Hunting, hiking, horseback riding, and vacation cottage sites are other recreational uses (fig. 9).

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 11 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 8, and interpretations for dwellings without basements and for local roads and streets, given in table 7.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface (fig. 10).

Wildlife Habitat

EDWARD G. SULLIVAN, biologist, Soil Conservation Service, assisted in preparing this section.

Of all the factors that affect wildlife populations, the way man uses the land is the most important. Regardless of how well suited a soil may be for producing wildlife habitat if the present land use eliminates the plant associations the soil is capable of producing for wildlife habitat, the animals will not be there. For this reason, the kinds and numbers of wild animals in Yalobusha County have varied over the years since the area was settled.

Before Yalobusha County was settled, the total area was predominantly forest. Hardwoods of many species were the dominant vegetation. In this condition animals adapted to forests were abundant. Some of these were squirrels, deer, turkeys, bobcats, wolves, eagles, and many kinds of birds including the now extinct passenger pigeon.

As this area was settled, logging and land clearing pushed the woodland animals farther back into remote areas. In their place came animals adapted to openland. Clearing fields, logging, burning, and other soil disturbances created vegetative patterns which met the needs of bobwhite quail, rabbits, doves, many types of ground and brush inhabiting song birds, rodents, and reptiles.

These conditions were responsible for some of the highest bobwhite quail populations anywhere in the country. As this trend continued, forest animal numbers further declined. Wolves, panthers, and, later, deer and turkeys disappeared. But agricultural and industrial demands and methods continued to change. After World War II, reforestation and wildlife management efforts

began. With restocking and management, deer and turkeys have been restored. More intensive farming methods have caused some decline in farm and openland wild animal numbers. Kinds and numbers of wild animals will continue to change as man's methods and demands on the land change.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. Examples are corn, wheat, oats, and barley. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Examples are fescue, lovegrass, bromegrass, clover, and alfalfa. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Examples are bluestem, goldenrod, beggarweed, and fescue. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Examples of native plants are oak, poplar, cherry, sweetgum, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated good are Russian-olive, autumn-olive, and crabapple. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Examples are pine, cedar, and juniper. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Examples of wetland plants are smartweed, wild millet, wildrice, and cattail. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control devices in marshes or streams. Examples are marshes, waterfowl feeding areas, and ponds. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail rabbit, and red fox.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, grey fox, raccoon, and deer.

Wetland habitat consists of open, marshy or swampy, shallow-water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Soil Properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classification, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Engineering Properties

Table 13 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 13 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil Series and Morphology."

Texture is described in table 13 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The estimated classification, without group index numbers, is given in table 13.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterburg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted in table 13.

Physical and Chemical Properties

Table 14 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and Water Features

Table 15 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep to deep, moderately well drained to well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent

slopes, and by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes is not considered flooding. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding; and information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated are the depth to the high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a high water table affects ease of excavation.

Test Data

Chemical Analyses of Soils

V. E. NASH, agronomist, Mississippi Agricultural and Forestry Experiment Station, assisted in preparing this section.

The soil analyses reported in table 16 were made in the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station. The procedures used were essentially like those given in the Soil Survey Investigation Report No. 1 (*5*).

Soil samples were collected from open pits by the soil scientist. Preparation of the samples for analyses at the laboratory consisted of air-drying, grinding, and screening through a No. 10 sieve.

The exchangeable cations, calcium, magnesium, potassium, and sodium were extracted by neutral, normal ammonium acetate (5Al) of SSIR 1. Calcium and magnesium in the extract were determined with a Perkin-Elmer atomic absorption apparatus using strontium chloride to suppress interference of Al, Si, and P. Potassium and sodium were analysed by Perkins-Elmer flame photometry using a Beckman flame spectrophotometer. Extractable acidity (H 0 Al) was extracted with barium chloride-triethanolamine buffered to pH 8.2.

The percentage base saturation was calculated by dividing the sum of the bases (Ca, Mg, Na, and K) by the sum of the cations and multiplying by 100. The sum of the cations include in additon to the bases the extractable acidity (H 0 Al).

Soil pH was determined potentiometrically with a Coleman pH meter using a 1:1 soil:water ratio.

The cation exchange capacity (CEC) is not only a measure of the ability of a soil to hold nutrient cations in an available form, but also gives clues as to the type of clay present. For example, montmorillonite has a CEC of 80-120 meq/100g and is the only high CEC mineral present in several of the soils. It is notorious for its high shrink-swell potential if one assumes that most of the CEC is in the clay fraction.

Calcium is the dominant basic exchangeable cation in most soils of Yalobusha County. The high content of calcium in the Ap horizons of several soils is, no doubt, the result of liming. Magnesium saturation of these soils is in the range of 5-10 percent, which is adequate for balanced plant nutrition. The parent material releases magnesium to the exchange complex. Some soils of this area have Ca/Mg ratios of less than 1. In these highly leached acid soils the calcium minerals have been removed and magnesium is being released from the clay minerals. Exchangeable potassium is low, usually less than 0.2 meq/100g or 156 pounds per acre where no fertilizer has been applied.

The soils analyzed from Yalobusha County are all acid as shown by the low pH, high extractable acidity, and low base saturation. The high acidity of most of these soils is another indication of high weathering intensity.

The Comprehensive Soil Classification Systems adopted by the National Cooperative Soil Survey makes use of chemical soil properties as differentiating criteria in some categories of the system. The Alfisol and Ultisol orders, which are classes in the highest category in the system, are separated on the basis of percentage base saturation, deep in the subsoil. Argillic horizons of the Ultisols have base saturations of less than 35 percent at a designated depth below 4 feet whereas the Alfisols have values greater than 35 percent. In the soils reported here Smithdale has a percent base saturation low enough to be classed as an Ultisol. The degree of weathering is inversely related to base saturation since this is a measure of the extent of the replacement of bases by hydrogen during the leaching process.

Particle Size Analyses of Selected Soils

The particle size analyses of these soils were obtained using the hydrometer method of Day (*3*). Forty grams of soil were dispersed in a 0.5 percent solution of sodium hexametaphosphate buffered with sodium carbonate by mixing 5 minutes in a milk shaker. The dispersed soil was transferred to a sedimentation cylinder, made to 1,000 ml and equilibrated overnight in a 30 degree C water bath. The suspension was then mixed and allowed to settle. Hydrometer readings were taken at predetermined times to determine the clay content. The sand was separated on a 325 mesh sieve and dried and weighed. All results are expressed on the basis of 110 degree C oven dry weight.

The physical properties of soils, such as water infiltration and conduction, shrink-swell potential, crusting, ease of tillage, consistence, and water holding capacity, are closely related to soil texture (i.e. the percentage of sand, silt, and clay).

The Ariel, Arkabutla, Cascilla, Collins, Gillsburg, and Oaklimeter soils have a high silt content which may result in adverse physical conditions. Often these soils pack excessively. A surface crust is formed by raindrops which may result in poor seedling germination and emergence. A plowpan also develops easily during tillage operations.

The surface horizons of the Bruno and Smithdale soils that were analyzed are loamy sands or sandy loam. These soils should allow good infiltration and movement of water through the soil. Tillage operations require less power compared to the clayey soils and the moisture content at the time of tillage is not so critical. Some problems with these sandy soils are the low water holding and nutrient absorption capacities.

Table 17 gives the particle size distribution of selected soils.

Engineering Test Data

Table 18 contains engineering test data for the Maben and Smithdale series. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

Moisture-density (compaction) data are important in earthwork. If a soil material is compacted at successively higher levels of moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is the maximum dry density. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

Classification of the Soils

In this section, the soil series recognized in the survey area are described, the current system of classifying soils is defined, and the soils in the area are classified according to the current system.

Soil Series and Morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*9*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or mapping units, of each soil series are described in the section "Soil Maps for Detailed Planning."

Ariel Series

The Ariel series consists of deep, well drained soils that formed in silty materials on broad, nearly level flood plains. Slopes are 0 to 2 percent.

Typical pedon of Ariel silt loam, occasionally flooded, approximately 7 miles southwest of Water Valley, 200 yards east of gravel road, and 100 feet north of creek; NW1/4NW1/4 sec. 1, T. 25 N., R. 5 E.:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

B21—7 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint yellowish brown mottles; weak fine and medium subangular blocky structure; very friable; common fine roots; strongly acid; clear smooth boundary.

B22—16 to 27 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct pale brown mottles; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

B23—27 to 32 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct pale brown (10YR 6/3) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; few oxide coatings; strongly acid; clear smooth boundary.

A2b—32 to 40 inches; pale brown (10YR 6/3) silt loam; many medium distinct yellowish brown (10YR 5/6) and many medium faint light

brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, brown part slightly compact and brittle; common medium black and brown stains and concretions; very strongly acid; clear smooth boundary.

B21b—40 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct light gray (10YR 7/1) mottles; weak coarse prismatic structure parting to weak medium subangular blocky structure; friable; slightly compact and brittle; common pores; few gray silt tongues between prisms; common medium black and brown concretions and stains; very strongly acid.

The A horizon is brown or dark yellowish brown silt loam or very fine sandy loam. The B2 horizon is brown, yellowish brown or dark yellowish brown silt loam with a clay content of 12 to 18 percent. The A2b horizon is pale brown, brown, or is mottled in shades of brown and gray. The B2b horizon is mottled in shades of gray and brown or has brownish colors with gray mottles. Texture is silt loam or loam. Black and brown concretions range from few to many. Reaction is strongly acid or very strongly acid in all horizons except A horizon that have been limed.

Ariel soils are associated with Cascilla, Collins, Gillsburg, and Oaklimeter soils. Ariel soils have less clay in the B2 horizon than Cascilla soils. They lack the bedding planes characteristic of Collins soils. They are browner and better drained than Gillsburg and Oaklimeter soils.

Arkabutla Series

The Arkabutla series consists of somewhat poorly drained soils that formed in silty materials. The Arkabutla soils are on broad, nearly level flood plains. Slopes are 0 to 2 percent.

Typical pedon of Arkabutla silt loam, occasionally flooded, approximately 6 miles east of Water Valley and 1/2 mile south of Highway 315, NE1/4NE1/4, sec. 5, T. 11 S., R. 3 W.:

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam with few medium distinct gray (10YR 5/1) mottles; weak medium granular structure; friable; many fine roots; few fine black concretions; slightly acid; clear smooth boundary.

B21—7 to 17 inches; dark yellowish brown (10YR 4/4) silt loam with common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine black concretions; strongly acid; clear smooth boundary.

B22g—17 to 27 inches; light brownish gray (10YR 6/2) silty clay loam with common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; firm; few fine roots; common fine and medium black and brown concretions; very strongly acid; gradual smooth boundary.

B23g—27 to 48 inches; light brownish gray (10YR 6/2) silt loam with common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; very strongly acid.

The A horizon is dark brown, brown, and dark grayish brown. Texture of the A horizon is silt loam, loam, or silty clay loam. The upper part of the B2 horizon is dark grayish brown, dark brown, dark yellowish brown, and yellowish brown with few to many pale brown, grayish brown, and light brownish gray mottles. Texture is silt loam or silty clay loam. The lower part of the B2 horizon is dominantly gray with few to many brownish mottles. Texture is silt loam, loam, or silty clay loam. The material of the C horizon is mottled in shades of gray and brown or gray with brownish mottles. Texture is silt loam, loam, or silty clay loam. Black or brown concretions range from few to many in all horizons. Reaction is strongly acid or very strongly acid throughout the soil except in surface layers that have been limed.

Arkabutla soils are associated with Cascilla, Collins, Gillsburg, and Oaklimeter soils. Arkabutla soils are grayer and not so well drained as Cascilla, Collins, and Oaklimeter soils. Arkabutla soils have higher clay content in the lower part of the soil than Collins, Gillsburg, and Oaklimeter soils.

Bonn Series

The Bonn series consists of poorly drained soils that formed in silty materials. The Bonn soils are on low stream terraces. Slopes range from 0 to 1 percent.

Typical pedon of Bonn silt loam in an area approximately 1.5 miles west of Tyson, 150 yards south of Mississippi Highway 330, and 100 yards west of field road. SE1/4SE1/4, sec. 21, T. 24 N., R. 7 E.:

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam; common medium faint brown (10YR 5/3) mottles; weak fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

A2g—6 to 13 inches; light brownish gray (2.5Y 6/2) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine brown concretions; very strongly acid; clear irregular boundary.

B21tg—13 to 31 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium distinct light olive brown (2.5Y 5/4) mottles; weak coarse columnar structure parting to moderate medium subangular blocky structure; few fine roots; firm, plastic, sticky; thin continuous clay films on faces of peds; common silt tongues approximately 1 inch wide extend through horizon; few fine brown concretions; medium acid; clear irregular boundary.

B22tg—31 to 49 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct light olive brown (2.5Y 5/4) mottles; weak coarse columnar structure parting to moderate medium subangular blocky structure; few fine roots; friable; thin patchy dark gray clay films on faces of peds; few silt tongues approximately 1 inch wide; mildly alkaline; gradual wavy boundary.

B3g—49 to 60 inches; gray (10YR 6/1) silty clay loam; many coarse distinct yellowish brown (10YR 5/6) mottles; weak coarse columnar structure parting to weak medium subangular blocky structure; firm, plastic, sticky; thin patchy clay films on faces of peds; many fine and medium black and brown concretions; mildly alkaline; gradual wavy boundary.

Cg—60 to 80 inches; gray (10YR 6/1) silty clay loam; many coarse distinct brownish yellow (10YR 6/8) mottles; massive; firm, plastic, sticky; many black and brown concretions; moderately alkaline.

The Ap horizon is brown, dark grayish brown, or grayish brown. It has a silt loam or very fine sandy loam texture. The A horizon is very strongly acid to neutral. The A2g horizon is gray or light brownish gray silt loam and has tongues extending into the horizon below. The Btg horizon is gray or light brownish gray silt loam or silty clay loam. The B horizon is medium acid to strongly alkaline, and exchangeable sodium exceeds 15 percent. The B3g and C horizons have colors and textures similar to horizons above. The C horizon is neutral to very strongly alkaline.

Bonn soils are associated with Calloway and Deerford soils. Bonn soils are wetter and not as brown as Calloway and Deerford soils. In addition, Bonn soils have a higher sodium content than Calloway soils.

Bruno Series

The Bruno series consists of excessively drained soils that formed in sandy materials. The Bruno soils are on flood plains. Slopes are 0 to 2 percent.

Typical pedon of Bruno sandy loam, occasionally flooded, 1 mile southwest of Water Valley about 1,000 yards west of Mississippi Highway 7 and 500 feet north of Otoucalofa Creek, SW1/4NW1/4 sec. 8, T. 11 S., R. 4 W.:

Ap—0 to 9 inches; dark brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

C1—9 to 12 inches; dark yellowish brown (10YR 4/4) sand; common medium distinct strong brown (7.5YR 5/8) mottles; single grained; loose; few fine roots; few fine carbon particles; strongly acid; abrupt smooth boundary.

C2—12 to 15 inches; dark yellowish brown (10YR 4/4) sandy loam; common medium distinct pale brown (10YR 6/3) and brown (7.5YR 4/4) mottles; massive; bedding planes and few thin horizontal strata of sand; friable; few fine roots; strongly acid; abrupt smooth boundary.

C3—15 to 19 inches; pale brown (10YR 6/3) sand; few medium distinct yellowish brown (10YR 5/8) mottles; single grained; loose; few fine roots; thin horizontal strata of yellowish brown loam; few fine flakes of mica; strongly acid; abrupt smooth boundary.

C4—19 to 21 inches; brown (10YR 5/3) silt loam; common medium distinct reddish brown (5YR 4/4) mottles; massive; bedding planes; friable; few fine roots; few thin strata and pockets of pale brown (10YR 6/3) loamy sand; yellowish red stains between bedding planes; strongly acid; abrupt smooth boundary.

C5—21 to 29 inches; brown (10YR 5/3) sand; common medium distinct yellowish brown (10YR 5/8) mottles; single grained; loose; few fine roots; few thin strata of yellowish brown (10YR 5/4) loam; common dark brown organic stains; neutral; abrupt smooth boundary.

C6—29 to 37 inches; light olive brown (2.5Y 5/4) loamy sand; common medium distinct yellowish brown (10YR 5/8), pale brown (10YR 6/3), and light brownish gray (10YR 6/2) mottles; single grained; loose; few fine roots; few thin horizontal strata of silt loam; slightly acid; abrupt smooth boundary.

C7—37 to 41 inches; pale brown (10YR 6/3) silt loam; common medium distinct yellowish brown (10YR 5/8) mottles; massive; with faint bedding planes; friable; few fine roots; strongly acid; abrupt smooth boundary.

C8—41 to 60 inches; pale brown (10YR 6/3) sand; common medium distinct yellowish brown (10YR 5/8) mottles; single grained; loose few fine roots; faint bedding planes; few fine flakes of mica; strongly acid.

The A horizon is brown, dark brown, dark yellowish brown, or yellowish brown. It has texture of sandy loam, loamy sand, or loam. The C horizons are pale brown, brown, dark brown, light olive brown, or dark yellowish brown. Texture is loamy sand or sand with thin strata of silt loam, loam, or sandy loam. Reaction ranges from strongly acid to mildly alkaline throughout the soil.

Bruno soils are associated with Collins and Oaklimeter soils. Bruno soils have a higher sand content than the associated soils and are excessively drained.

Calloway Series

The Calloway series consists of somewhat poorly drained silty soils that have fragipans. The Calloway soils are on low, nearly level stream terraces. Slopes are 0 to 2 percent.

Typical pedon of Calloway silt loam, 0 to 2 percent slopes, in an area 1/2 mile east of Gums Crossing and 1/4 mile south of Mississippi Highway 330, NW1/4NE1/4 sec. 25, T. 24 N., R. 6 E.:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; common fine and medium black and brown concretions; slightly acid; clear smooth boundary.

B21—5 to 13 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; few fine brown concretions; strongly acid; clear smooth boundary.

B22—13 to 18 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; few fine roots; few fine pores; common fine and medium black and brown concretions; strongly acid; clear smooth boundary.

A'2&B'x1—18 to 23 inches; pale brown (10YR 6/3) silt loam; common medium distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, yellowish brown part brittle; few fine roots; many voids; common fine and medium brown concretions; strongly acid; clear irregular boundary.

B'x2—23 to 30 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky structure; firm, compact and brittle; few black concretions; thin continuous clay films on faces of peds; many fine voids; tongues of gray silt between prisms; strongly acid; clear wavy boundary.

B'x3—30 to 36 inches; yellowish brown (10YR 5/4) silt loam; many medium faint yellowish brown (10YR 5/8) and grayish brown (10YR 5/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky structure; firm, compact and brittle; thick continuous clay films on faces of peds; many fine voids; tongues of gray silt between prisms; few black concretions; strongly acid; clear wavy boundary.

B'x4—36 to 53 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parts to weak medium subangular blocky structure; slightly brittle and compact; thin patchy clay films on faces of peds; common black concretions; strongly acid; clear wavy boundary.

B'x5—53 to 70 inches; mottled yellowish brown (10YR 5/4), dark yellowish brown (10YR 4/4) and light brownish gray (10YR 6/2) silt loam; weak coarse prismatic structure parts to weak coarse subangular blocky structure; slightly brittle and compact; thin patchy clay films on faces of peds; few fine brown concretions; slightly acid.

The A horizon has color of brown, grayish brown, or light yellowish brown. The B2 horizon is yellowish brown, dark yellowish brown, or light yellowish brown silt loam with grayish mottles in the lower part. It has a clay content of 18 to 25 percent and has less than 10 percent sand. The A'2 & B'x1 horizon is pale brown, light brownish gray, or light gray silt or silt loam with few to many brownish mottles and remnants of the B horizon. The silt loam or silty clay loam Bx horizon has matrix colors of brown, yellow, and gray or is mottled with these colors. Depth to the Bx horizon is 16 to 24 inches from the surface. Few to many black and brown concretions are throughout the solum. Reaction ranges from very strongly acid to medium acid, except in the lower part of the solum which ranges from strongly acid to neutral.

Calloway soils are associated with Bonn, Deerford, and Grenada soils. Calloway soils are browner than Bonn and are not as wet. They have gray mottles in the upper 16 inches and are wetter than Grenada. Calloway soils are similar to Deerford in drainage class and color but Deerford soils do not have a fragipan. In addition, Calloway soils have lower amounts of exchangeable sodium than Bonn and Deerford soils.

Cascilla Series

The Cascilla series consists of well drained soils that formed in silty materials. The Cascilla soils are on broad nearly level flood plains. Slopes are 0 to 2 percent.

Typical pedon of Cascilla silt loam, occasionally flooded, in an area in Turkey Creek bottom, 0.3 mile northeast of Turkey Creek-Skuna Valley railroad crossing. SW1/4-SW1/4 sec. 9, T. 24 N., R. 6 E.:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; strongly acid; clear smooth boundary.

B21—7 to 25 inches; dark yellowish brown (10YR 4/4) silt loam; few medium faint pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

B22—25 to 31 inches; yellowish brown (10YR 5/4) silt loam; common medium faint dark yellowish brown (10YR 4/4) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

B23—31 to 39 inches; yellowish brown (10YR 5/4) silt loam; common medium faint dark yellowish brown (10YR 4/4) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine black and brown concretions; strongly acid; clear smooth boundary.

B3—39 to 59 inches; yellowish brown (10YR 5/4) silt loam; common medium faint pale brown (10YR 6/3) and common medium faint yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine brown concretions; strongly acid; clear smooth boundary.

IIC—59 to 72 inches; yellowish brown (10YR 5/4) loam; common medium faint pale brown (10YR 6/3) and common medium faint yellowish brown (10YR 5/8) mottles; massive; very friable; few medium soft black and brown concretions; strongly acid.

The A horizon is brown, yellowish brown or dark yellowish brown. The B horizons are brown, yellowish brown, or dark yellowish brown silt loam. Some pedons have gray mottles below a depth of 24 inches. Clay content of the 10 to 40 inch control section ranges from 18 to 24 percent. The C horizon is similar to the B horizon in color and has a texture of fine sandy loam, loam, or silt loam. Reaction of the soil, except surface layers that have been limed, is strongly acid or very strongly acid.

Soils with slightly less than 18 percent clay in the control section were considered Cascilla in naming mapping units. They are enough like the Cascilla soils in behavior that nothing would be gained by classifying them in a different series.

Cascilla soils are associated with Ariel, Arkabutla, and Oaklimeter soils. Cascilla soils have more clayey B horizons than the Ariel and Oaklimeter soils. They lack the gray mottles within 24 inches of the surface of the Oaklimeter soils. Cascilla soils are not as gray and are better drained than the Arkabutla soils.

Collins Series

The Collins series consists of moderately well drained soils that formed in silty material. The Collins soils are on nearly level flood plains. Slopes are 0 to 2 percent.

Typical pedon of Collins silt loam, occasionally flooded, in an area 3.5 miles northwest of Coffeeville in Cypress Creek bottom, 400 feet west of creek and 1700 feet south of road. SW1/4SW1/4 sec. 25, T. 25 N., R. 5 E.:

Ap—0 to 9 inches; brown (10YR 5/3) silt loam; weak fine granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.

C1—9 to 18 inches; brown (10YR 4/3) silt loam; common medium faint yellowish brown (10YR 5/4) and pale brown (10YR 6/3) mottles; few thin strong brown (7.5YR 5/6) strata; massive, bedding planes and thin horizontal strata; friable; few fine roots; strongly acid; clear smooth boundary.

C2—18 to 31 inches; brown (10YR 5/3) silt loam; common medium distinct light brownish gray (10YR 6/2) and common medium faint yellowish brown (10YR 5/4) mottles; massive, bedding planes and thin horizontal strata; friable; few fine roots; common dark brown and reddish brown stains; strongly acid; clear smooth boundary.

C3—31 to 46 inches; mottled light brownish gray (10YR 6/2) yellowish brown (10YR 5/4) and pale brown (10YR 6/3) silt loam; massive, bedding planes and thin horizontal strata; friable; common reddish brown stains; strongly acid; clear smooth boundary.

C4g—46 to 55 inches; gray (10YR 6/1) silt loam; many coarse distinct brown (10YR 4/3) and yellowish brown (10YR 5/4) mottles; massive, faint bedding planes; friable; common brown and dark brown stains and soft concretions; very strongly acid.

Reaction, except for surface layers that have been limed, is strongly acid to very strongly acid.

The A horizon is brown, yellowish brown, or dark yellowish brown in color. It has a texture of silt loam, loam, or very fine sandy loam. The upper C horizon is similar in color to the A horizon and has grayish mottles to a depth of 20 inches. The lower C horizon is gray with brownish mottles. Clay content of the 10 to 40 inch control section is less than 18 percent. Texture of the C horizon is silt loam or silt.

Collins soils are associated with Ariel, Arkabutla, and Oaklimeter soils. Collins soils have gray mottles within 20 inches of the surface and have bedding planes, whereas Ariel soils lack the grayish mottles to a depth of 24 inches and lack bedding planes. They are not as gray and are less clayey than the Arkabutla soils. Oaklimeter soils do not have bedding planes in the upper 20 inches.

Deerford Series

The Deerford series consists of somewhat poorly drained silty soils that are high in sodium. The Deerford soils are on low stream terraces. Slopes are 0 to 2 percent.

Typical pedon of Deerford silt loam in an area of Deerford complex 1.5 miles west of Tyson, 500 yards south of Mississippi Highway 330, and 300 yards west of field road. SE1/4SE1/4 sec. 21, T. 24 N., R. 7 E.:

Ap—0 to 8 inches; brown (10YR 5/3) silt loam; common medium faint pale brown (10YR 6/3) mottles; weak fine granular structure; friable; many fine roots; few yellowish brown (10YR 5/8) stains; medium acid; abrupt smooth boundary.

B21t—8 to 19 inches; yellowish brown (10YR 5/6) silt loam; few medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; common fine roots; thin patchy clay films on faces of peds; strongly acid; clear smooth boundary.

B22t&A'2—19 to 21 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light gray (10YR 7/2) and common medium faint yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; few fine roots; few tongues of light gray (10YR 7/2) silt loam; common fine voids; common fine brown concretions; strongly acid; clear wavy boundary.

B23t—21 to 31 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; ped exteriors are light gray (10YR 7/2); moderate medium prismatic structure parting to moderate medium subangular blocky structure; slightly firm, plastic and sticky; few fine roots; thick continuous clay films on faces of peds; few tongues of silt loam; strongly acid; clear wavy boundary.

B24t—31 to 43 inches; yellowish brown (10YR 5/4) silty clay loam; common coarse distinct light gray (10YR 7/2) and few medium faint yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky structure;

firm, plastic, sticky; few fine roots; thick continuous clay films on faces of peds; few tongues of light brownish gray silt loam; moderately alkaline; clear smooth boundary.

B3—43 to 50 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and common medium faint yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; few fine roots; thin patchy clay films; few pockets of gray silt loam; few fine brown concretions; moderately alkaline; clear wavy boundary.

C—50 to 60 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct light gray (10YR 6/1) and few medium faint yellowish brown (10YR 5/8) mottles; massive; firm, slightly plastic and sticky; few fine roots; few fine black and brown concretions; moderately alkaline.

Reaction ranges from very strongly acid to medium acid in the upper part and to moderately alkaline in lower horizons.

The A horizon is brown, yellowish brown, dark yellowish brown, or pale brown. The B21t horizon is yellowish brown, light olive brown, or dark yellowish brown silt loam or silty clay loam with gray mottles. It has a clay content of about 18 to 28 percent. The B22t & A'2 horizon is light yellowish brown, yellowish brown, or pale brown, and gray. Some pedons have an A'2 or A'2 & B'22t horizon. The B23t and B24t horizons are yellowish brown with gray mottles or have dominant gray colors with brownish mottles. They are silt loam or silty clay loam with a clay content of about 22 to 35 percent. Exchangeable sodium percentages in the B22t and B23t horizons are more than 15 percent. The B3 and C horizons have the same color ranges as the lower Bt horizon.

Soils with alkaline reactions in the upper part of the subsoil were considered Deerford in naming mapping units. They are enough like the Deerford soils in behavior that nothing would be gained by classifying them in a different series.

Deerford soils are associated with Bonn and Calloway soils. Deerford soils are browner and not as wet as Bonn. They are similar to Calloway in color and texture but have a higher amount of sodium and do not have a fragipan.

Gillsburg Series

The Gillsburg series consists of somewhat poorly drained soils that formed in silty material. The Gillsburg soils are on nearly level flood plains and low stream terraces. Slopes are 0 to 2 percent.

Typical pedon of Gillsburg silt loam, occasionally flooded, from an area 7.5 miles east of Coffeeville. SE1/4SW1/4 sec. 22, T. 25 N., R. 7 E.:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; few fine and medium black concretions; medium acid; clear smooth boundary.

B21—5 to 13 inches; mottled brown (10YR 4/3) and pale brown (10YR 6/3) silt loam; weak medium subangular blocky structure; friable; few fine roots; few fine and medium black concretions; strongly acid; clear smooth boundary.

B22—13 to 19 inches; mottled brown (10YR 5/3) and light brownish gray (10YR 6/2) silt loam; weak medium subangular blocky structure; friable; few fine roots; few medium brown and black concretions; very strongly acid; clear wavy boundary.

B23g—19 to 35 inches; gray (10YR 6/1) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; friable; yellowish brown part is brittle and compact; common voids; few medium black and brown concretions; very strongly acid; gradual wavy boundary.

A2gb—35 to 44 inches; gray (10YR 6/1) silt loam; common coarse distinct dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parts to weak medium subangular blocky structure; friable; dark yellowish brown part is brittle and compact; few medium brown and black concretions; very strongly acid; gradual wavy boundary.

Bgb—44 to 60 inches; gray (10YR 6/1) loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parts to weak medium subangular blocky structure; friable; yellowish brown part is brittle and compact; many coarse black and brown concretions; strongly acid.

The Ap horizon is brown or dark grayish brown. It is silt, silt loam, or very fine sandy loam. The upper part of the B2 horizon is brownish with gray mottles, or it is mottled in shades of brown and gray. The lower part of the B2 horizon is grayish brown, light brownish gray or gray with brownish mottles. Texture of the A and B2 horizons is silt loam with less than 18 percent clay. Buried horizons have colors similar to those of the lower part of the B2 horizons. Texture is silt loam, loam, or silty clay loam. Reaction is strongly acid or very strongly acid except for surface layers that have been limed. Black and brown concretions range from few to many.

Gillsburg soils are associated with Ariel, Arkabutla, and Oaklimeter soils. They are grayer and not as well drained as the Ariel and Oaklimeter soils. Gillsburg soils have less clayey B horizons than the Arkabutla soils.

Grenada Series

The Grenada series consists of moderately well drained soils with fragipans. They formed in silty materials on uplands. Slopes are 0 to 5 percent.

Typical pedon of Grenada silt loam, 0 to 2 percent slopes, in an area 1 1/2 miles southwest of Oakland School, 800 feet east of Tallahatchie County line and 100 feet south of fence. NW1/4NW1/4 sec. 30, T. 25 N., R. 4 E.:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; slightly compact in lower part; few fine roots; few fine black concretions; very strongly acid; abrupt smooth boundary.

B21—7 to 20 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few fine pores; thin clay films in pores; some Ap material in old root channels; few black concretions; very strongly acid; clear smooth boundary.

B22—20 to 26 inches; yellowish brown (10YR 5/4) silt loam; few fine faint pale brown mottles; moderate medium subangular blocky structure; friable; few fine roots; thin clay films in pores; light brownish gray silt coatings on some peds; common medium black concretions; very strongly acid; clear smooth boundary.

B'x1&A'2—26 to 30 inches; dark yellowish brown (10YR 4/4) silt loam; many medium distinct pale brown (10YR 6/3) pockets and coats of A'2 material; weak medium subangular blocky structure; dark yellowish brown part is firm, compact and brittle; many medium and coarse black concretions; common voids; very strongly acid; clear irregular boundary.

B'x2—30 to 40 inches; mottled yellowish brown (10YR 5/4) gray (10YR 6/1) and dark yellowish brown (10YR 4/4) silty clay loam; weak coarse prismatic structure that parts to moderate medium subangular blocky structure; firm, compact, and brittle; thin continuous clay films on faces of peds; tongues of gray silt loam between prisms; common fine black concretions; very strongly acid; gradual wavy boundary.

B'x3—40 to 52 inches; dark yellowish brown (10YR 4/4) silt loam with many medium and coarse distinct light brownish gray (10YR 6/2) and common medium faint yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure that parts to weak subangular blocky structure; firm, compact, and brittle; thin patchy clay film on faces of peds; common fine black and brown concretions, strongly acid.

The A horizon is dark grayish brown, grayish brown, yellowish brown, or dark yellowish brown. The B horizon is yellowish brown or dark yellowish brown and lacks gray mottles to a depth of 16 inches. The silt loam in the upper part of the B horizon is 18 to 27 percent clay and less than 10 percent sand. The B'x1 and A'2 horizon is pale brown, yellowish brown, and dark yellowish brown or is mottled in shades of brown and gray. Some pedons have are A'2 horizon that is pale brown, dark yellowish brown, light brownish gray, or light gray with yellowish brown mottles and remnants of the B horizon. It has a texture of silt loam or silt. The B'x horizon is yellowish brown or dark yellowish brown or is mottled in shades of brown, yellow, and gray. It has a texture of silt loam or silty clay loam.

Depth to the B'x horizon ranges from 20 to 34 inches. Black and brown concretions range from few to many. Reaction is medium acid to very strongly acid except in the surface layer where lime has been applied.

Grenada soils are associated with Calloway, Loring, and Memphis soils. Grenada soils lack gray mottles in the upper 16 inches and are better drained than Calloway. Grenada soils differ from Loring soils in that they are bisequal and have an A'2 horizon. Grenada soils differ from the Memphis soils by having a fragipan.

Loring Series

The Loring series consists of moderately well drained soils with a fragipan. They formed in silty material on uplands. Slopes are 2 to 12 percent.

Typical pedon of Loring silt loam, 2 to 5 percent slopes, eroded, in an area 3 miles east of Oakland, 1 1/2 miles north of Highway 330 on west bank of gravel road. NW1/4NW1/4 sec. 2, T. 25 N., R. 4 E.:

Ap—0 to 3 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

B21t—3 to 17 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; thin continuous clay films on faces of peds; strongly acid; clear smooth boundary.

B22t—17 to 31 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; thin continuous clay films on faces of peds; common pale brown silt coats; few fine brown concretions; strongly acid; clear smooth boundary.

Bx1—31 to 53 inches; dark brown (7.5YR 4/4) silt loam; common medium distinct pale brown (10YR 6/3) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky structure; firm, compact, and brittle; thin continuous clay films on faces of peds; few voids; gray silt between prisms; few black concretions; strongly acid; clear wavy boundary.

Bx2—53 to 65 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct pale brown (10YR 6/3) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky structure; firm, compact, and brittle; thin patchy clay films; few fine voids; gray silt between prisms; common fine and medium black concretions; strongly acid.

Color of the Ap horizon is brown, dark brown, dark yellowish brown, or yellowish brown. The A1 horizon, where present, is dark grayish brown or grayish brown. The Bt horizon is dark brown, dark yellowish brown, yellowish brown, or strong brown silty clay loam or silt loam with a clay content in the upper 20 inches of 20 to 30 percent. Depth to the fragipan is 22 to 32 inches. The fragipan is dark brown, strong brown, and dark yellowish brown with few to many pale brown and gray mottles. A friable B3 horizon may be present below a depth of about 4 feet. It has colors similar to those of the layers above and is silt loam. A few black and brown concretions may be in the lower part of the Bt and Bx horizons. Reaction is medium acid to very strongly acid except for surface layers where lime has been applied.

Loring soils are associated with Grenada, Memphis, and Providence soils. Loring soils have oriented clay in the upper part of the B horizon, and they lack A'2 horizons common to Grenada soils. Loring soils are similar to Memphis soils except Memphis soils do not have a fragipan. Loring soils are similar to Providence soils, but they lack more than 15 percent sand in some part of the B horizon.

Maben Series

The Maben series consists of well drained soils that formed in clayey materials over stratified deposits of shaly clays and sandy sediments. The Maben soils normally occur on mid and lower slopes. Slopes are 8 to 30 percent.

Typical pedon of Maben fine sandy loam in an area of Maben-Smithdale association, hilly, 4 miles north of Highway 330 and 1 mile west of Calhoun County line, 75 feet west of road. SW1/4SW1/4 sec. 36, T. 25 N., R. 7 E.:

A1—0 to 2 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable; many fine roots; very strongly acid; clear smooth boundary.

A2—2 to 4 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common fine roots; common ironstone fragments 1/4 to 1/2 inch across and 1/8 inch thick; strongly acid; clear smooth boundary.

B21t—4 to 7 inches; reddish brown (5YR 5/4) clay; ped interiors are yellowish red (5YR 5/8); strong medium angular and subangular blocky structure; firm, plastic, and sticky; common fine roots; thin continuous clay films on faces of peds; very strongly acid; clear smooth boundary.

B22t—7 to 18 inches; yellowish red (5YR 5/6) clay; strong medium angular and subangular blocky structure; firm, plastic, and sticky; common fine roots; thin continuous clay film on faces of peds; very strongly acid; clear smooth boundary.

B23t—18 to 28 inches; yellowish red (5YR 5/6) clay loam; common medium distinct strong brown (7.5YR 5/6) and pale brown (10YR 6/3) mottles; moderate medium angular and subangular blocky structure; firm, plastic, and sticky; few fine roots; thin continuous clay films on faces of peds; few fine gray (10YR 6/1) shale fragments; few fine flakes of mica; very strongly acid; clear smooth boundary.

C1—28 to 35 inches; mottled red (2.5YR 5/8), yellowish brown (10YR 5/4), and gray (10YR 6/1) clay loam; weathered shale appears as horizontal platy rock structure in place but breaks to moderate medium subangular blocky structure when removed; slightly firm; few fine roots in cracks; light brownish gray coatings on ped faces; few fine flakes of mica; very strongly acid; clear smooth boundary.

C2—35 to 43 inches; gray (5Y 6/1) soft weathered shale; common medium distinct red (2.5YR 5/8) and reddish yellow (7.5YR 6/8) mottles; horizontal platy rock structure; firm; few roots in cracks; few flakes of mica; very strongly acid; clear smooth boundary.

C3—43 to 48 inches; stratified layers of gray (5Y 6/1) soft weathered shale and reddish yellow (7.5YR 6/8) loam; massive shale has horizontal platy rock structure; few fine flakes of mica in loam part; very strongly acid; clear smooth boundary.

C4—48 to 72 inches; gray (5Y 6/1) weathered shale; thin strata of reddish yellow (7.5YR 6/8) loam; shale has horizontal platy rock structure; loam contains few fine flakes of mica; strongly acid.

The A horizon is dark grayish brown, brown, or yellowish brown fine sandy loam or silt loam. The Bt horizon is reddish brown, yellowish red, or red clay, silty clay, or clay loam. The upper 20 inches of it is 35 to 55 percent clay and more than 20 percent silt. The B3 horizon, where present, has colors of red, yellowish red, and gray and consists of a mixture of the B horizon and partly weathered material from the C horizon. The C horizon is soft shale or stratified sand, loam, sandy loam, clay,

and shale. Reaction is very strongly acid to medium acid except in surface layers that have been limed.

Soils with gray mottles in the upper part of the argillic horizon were considered Maben in naming the units. They account for about 16 percent of the Maben soils. Soils with slightly less than 35 percent clay in the control section were also considered Maben. They account for about 16 percent of the Maben soils. These soils are enough like the Maben soils in behavior that nothing would be gained by classifying them in a different series.

Maben soils are associated with Providence, Smithdale, and Tippah soils. Maben soils are clayey in the B horizon and the associated soils are loamy in the B horizon. Providence soils have fragipans.

Memphis Series

The Memphis series consists of well drained silty soils that formed in silty material on uplands. Slopes are 2 to 20 percent.

Typical pedon of Memphis silt loam, 2 to 5 percent slopes, eroded, in an area 3 miles east of Oakland, 1 mile north of Highway 330, and 1/2 mile west of gravel road. NW1/4NE1/4 sec. 3, T. 25 N., R. 4 E.:

Ap—0 to 4 inches; dark brown (10YR 4/3) silt loam; weak medium granular structure; friable; common fine roots; strongly acid; abrupt smooth boundary.

B21t—4 to 21 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; thin continuous clay films on faces of peds; few fine black concretions and stains; strongly acid; clear smooth boundary.

B22t—21 to 38 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; thin continuous clay films on faces of peds, few pale brown silt coats; few fine black concretions and stains; strongly acid; gradual smooth boundary.

B3—38 to 60 inches; dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; thin patchy clay films; few pale brown silt coats; few fine black concretions, strongly acid.

Color of the Ap horizon is brown or dark brown. The A1 horizon, where present, is grayish brown or dark grayish brown. The Bt horizon is a dark brown, brown, strong brown, dark yellowish brown, or yellowish brown. Texture is a silty clay loam or silt loam with 20 to 30 percent clay in the upper 20 inches. The B3 and C horizons have colors ranging from dark brown to yellowish brown. Pale brown or light gray silt coatings are in the lower part of most profiles. Black concretions range from none to few in the lower part of the solum. Reaction is medium acid through very strongly acid, except for surface layers where lime has been applied.

Memphis soils are associated with Grenada and Loring soils, both of which have fragipans. Memphis soils lack a fragipan and have better internal drainage than the associated soils.

Oaklimeter Series

The Oaklimeter series consists of moderately well drained soils that formed in silty material. The Oaklimeter soils are on nearly level flood plains. Slopes are 0 to 2 percent.

Typical pedon of Oaklimeter silt loam, occasionally flooded, in an area 3 1/2 miles south of Sylva Rena, 20 yards south of field road and 15 yards west of drainage ditch. SE1/4SW1/4 sec. 28, T. 11 S., R. 5 W.:

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; few fine distinct pale brown mottles; weak fine granular structure; friable; common fine roots; few reddish brown stains around roots; very strongly acid; clear smooth boundary.

B21—6 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct pale brown (10YR 6/3) and few medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine brown soft concretions; very strongly acid; clear smooth boundary.

B22—18 to 27 inches; dark brown (10YR 4/3) silt loam; common medium distinct pale brown (10YR 6/3) and few medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine brown concretions; very strongly acid; abrupt smooth boundary.

A2b&B2b—27 to 52 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) and few medium faint pale brown (10YR 6/3) mottles; weak coarse prismatic structure parting to weak medium subangular blocky structure; gray part is friable, brown part is slightly brittle and compact; few fine roots in gray part; common fine voids coated with clay films; few medium brown concretions and few fine black concretions; very strongly acid; clear irregular boundary.

Bgb—52 to 70 inches; mottled pale brown (10YR 6/3), light brownish gray (10YR 6/2), and light gray (10YR 7/1) silt loam; weak coarse prismatic structure parting to weak medium subangular blocky structure; firm, slightly brittle, and compact; few fine voids coated with clay films; few fine brown concretions; very strongly acid.

Color of the A horizon is brown, dark brown, or dark yellowish brown. Texture is silt loam or very fine sandy loam. The upper part of the B horizon is brown, yellowish brown, and dark yellowish brown with few to common pale brown and gray mottles. The lower part has similar colors, but the proportion of gray color is greater.

Texture of the control section between depths of 10 and 40 inches is silt loam, very fine sandy loam, or loam with 8 to 18 percent clay. Depth to the buried horizons ranges from 20 to 40 inches. The A2b & B2b and Bgb horizons are gray, light gray, light brownish gray, and grayish brown or are mottled in shades of gray and brown. Black and brown concretions range from none to common in all horizons. The reaction is strongly acid or very strongly acid, except for surface layers that have been limed.

Oaklimeter soils are associated with Ariel, Cascilla, Collins, and Gillsburg soils. They are similar to Ariel and Cascilla soils but have gray mottles above 24 inches. Oaklimeter soils lack the bedding planes associated with the Collins soils. They are browner and not as wet as Gillsburg soils.

Providence Series

The Providence series consists of moderately well drained soils with a fragipan that formed in silty material over loamy material. Slopes are 2 to 15 percent.

Typical pedon of Providence silt loam, 8 to 15 percent slopes, severely eroded, in a road cut 7 miles northwest of Coffeeville. NW1/4SE1/4 sec. 10, T. 25 N., R. 5 E.:

Ap—0 to 2 inches; dark brown (10YR 4/3) silt loam; few medium faint dark grayish brown (10YR 4/2) mottles; weak fine granular structure; friable; many fine roots; very strongly acid; abrupt smooth boundary.

B2t—2 to 19 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; thin continuous clay films on faces of peds; very strongly acid; clear wavy boundary.

Bx1—19 to 27 inches; dark brown (7.5YR 4/4) silt loam with many coarse distinct pale brown (10YR 6/3) and yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate

medium subangular blocky structure; firm, compact, and brittle; thick patchy clay films on faces of peds; pale brown silt coatings around peds and between prisms; few fine black concretions and stains; very strongly acid; clear wavy boundary.

Bx2—27 to 36 inches; yellowish brown (10YR 5/6) silt loam with common medium distinct light brownish gray (10YR 6/2) and brown (7.5YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky structure; firm, compact, and brittle; thick patchy clay films on faces of peds; many voids; pale brown silt coatings between prisms; very strongly acid; clear smooth boundary.

IIBx3—36 to 54 inches; dark brown (7.5YR 4/4) loam; common medium distinct pale brown (10YR 6/3) and few fine distinct light brownish gray mottles; weak coarse prismatic structure parting to weak medium subangular blocky structure; firm, compact, and brittle; thin patchy clay films on faces of peds, few black stains; pale brown silt coatings between prisms; very strongly acid; clear wavy boundary.

IIB3t—54 to 80 inches; strong brown (7.5YR 5/6) sandy loam; few medium distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; few fine black stains; medium acid.

The A horizon is dark grayish brown, dark brown, brown, or yellowish brown silt loam. The Bt horizon is strong brown, dark brown, brown, or yellowish brown silt loam or silty clay loam. It has a clay content of 22 to 30 percent in the upper 20 inches. Depth to the fragipan ranges from 18 to 38 inches. The Bx and IIBx horizons range in color from yellowish red to brown with mottles in shades of brown, gray, and red; or the horizons are mottled in shades of brown, gray, and red. Texture of the Bx horizon is silt loam or silty clay loam, and the IIBx horizon is loam, clay loam, or sandy clay loam. The IIBt horizon is strong brown to red with mottles in shades of brown, red, or gray. Texture is sandy loam, loam, or sandy clay loam. Reaction of the soil is medium acid to very strongly acid, except for surface layers that have been limed.

Providence soils are associated with Loring, Maben, Smithdale, and Tippah soils. Providence soils are similar to Loring but have more than 15 percent sand in the lower part of the solum. Providence soils have fragipans, which Smithdale, Maben, and Tippah soils lack (fig. 11).

Smithdale Series

The Smithdale series consists of well drained soils that formed in loamy material. Slopes are 12 to 40 percent.

Typical pedon of Smithdale loamy sand in an area of Smithdale-Providence association, hilly, 7.5 miles northeast of Coffeeville, 1/4 mile north of fork of road and 150 feet east into woods. NE1/4NE1/4 sec. 28, T. 25 N., R. 7 E.:

A1—0 to 4 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; many fine roots; medium acid; clear smooth boundary.

A2—4 to 14 inches; light yellowish brown (10YR 6/4) loamy sand; weak medium subangular blocky structure; very friable; common fine and medium roots; medium acid; clear smooth boundary.

B21t—14 to 32 inches; yellowish red (5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; thin patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—32 to 45 inches; yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; thin patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

B23t—45 to 70 inches; yellowish red (5YR 5/8) sandy loam; weak medium subangular blocky structure; friable; few fine roots; sand grains coated and bridged with clay; few pockets of uncoated sand grains; common fine flakes of mica; strongly acid.

The A1 horizon is dark gray, dark grayish brown, or brown sandy loam, fine sandy loam, or loamy sand. The A2 horizon is pale brown, light yellowish brown, or yellowish brown sandy loam, fine sandy loam, or loamy sand. The Bt horizon is red or yellowish red sandy clay loam, loam, or clay loam. Clay content of the upper 20 inches of the Bt horizon ranges from 18 to 30 percent. The lower part of the B horizon has colors similar to those of the upper part. It has textures of sandy clay loam, loam, or sandy loam with pockets of loamy sand and uncoated sand. Few to many siltstone or sandstone fragments are in some profiles. Reaction is strongly acid or very strongly acid except in surface layers that have been limed.

Soils that lack a significant decrease in clay to a depth of 60 inches and soils that are bisequal in nature were considered Smithdale in naming the units. They make up about 14 percent of the Smithdale soils. Soils with solum thickness of less than 60 inches were also considered Smithdale in naming the units. The percentage of these soils is small. These soils are enough like Smithdale in behavior that nothing would be gained by classifying them in a different series.

Smithdale soils are associated with Maben, Providence, and Tippah soils. Smithdale soils have a higher sand content throughout than the associated soils. Providence soils have a fragipan.

Tippah Series

The Tippah series consists of moderately well drained soils that formed in silty material. Slopes are 5 to 12 percent.

Typical pedon of Tippah silt loam, 5 to 8 percent slopes, eroded, in an area 1 3/4 miles north of Mississippi Highway 32 and 1 1/2 miles west of Calhoun County line, 100 feet west of road. NE1/4SW1/4 sec. 11, T. 24 N., R. 7 E.:

Ap—0 to 6 inches; yellowish brown (10YR 5/6) silt loam; common fine distinct yellowish red mottles; weak fine granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

B21t—6 to 21 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; common fine roots; thin continuous clay films on faces of peds; very strongly acid; clear smooth boundary.

B22t—21 to 25 inches; strong brown (7.5YR 5/6) silt loam; common medium distinct light brownish gray (10YR 6/2), and common medium faint pale brown (10YR 6/3) and yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary; few pale brown (10YR 6/3) silt coats on some ped faces; few medium brown concretions.

B23t—25 to 30 inches; strong brown (7.5YR 5/6) silty clay loam; common medium distinct gray (10YR 6/1) and common medium faint yellowish brown (10YR 5/6) mottles; moderate medium angular and subangular blocky structure; firm, plastic; few fine roots; thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

IIB24t—30 to 35 inches; mottled yellowish red (5YR 4/6), light olive brown (2.5Y 5/4), and light brownish gray (2.5Y 6/2) silty clay; moderate medium angular blocky structure; very firm, plastic; few fine roots; thin continuous clay films or pressure faces on peds; very strongly acid, clear smooth boundary.

IIB25t—35 to 47 inches; yellowish red (5YR 5/6) clay; few fine distinct gray (10YR 6/1) and light yellowish brown (2.5Y 6/4) mottles; moderate fine angular blocky structure; very firm, plastic; few fine roots; thin continuous clay films or pressure faces on peds; few

slickensides that do not intersect; very strongly acid; clear smooth boundary.

IIB26t—47 to 52 inches; yellowish red (5YR 5/8) clay; common medium prominent light olive brown (2.5Y 5/4) and light brownish gray (2.5Y 6/2) mottles; weak fine angular blocky structure; very firm, plastic; few fine roots; thin patchy clay films or pressure faces on peds; few fine reddish brown concretions; very strongly acid; clear smooth boundary.

IIB3t—52 to 65 inches; mottled yellowish red (5YR 5/8) and gray (10YR 6/1) silty clay; weak fine angular blocky structure; firm, plastic; few fine roots; thin patchy clay films on faces of peds; strongly acid; clear smooth boundary.

IIC—65 to 72 inches; mottled gray (10YR 6/1), yellowish brown (10YR 5/6), and yellowish red (5YR 5/8) silty clay loam in thin horizontal strata; massive; firm, plastic; few thin lenses of sandy material; few fine flakes of mica; strongly acid.

The Ap horizon is brown or yellowish brown silt loam or loam. The Bt horizon is reddish brown or strong brown silt loam or silty clay loam. The upper 20 inches is 22 to 33 percent clay. Grayish and brownish mottles are in the lower part of the Bt horizon. The IIBt horizon is silty clay or clay with colors of red and gray or is mottled in shades of red and gray. Reaction is very strongly acid to medium acid except in surface layers that have been limed.

Soils with an abrupt textural change between the Bt and IIBt horizons were considered Tippah in naming units. The acreage of this soil is small, and it is enough like the Tippah soils in behavior that nothing would be gained by classifying them in a different series.

Tippah soils are associated with Maben, Providence, and Smithdale soils. Tippah soils are not as clayey in the upper part of the B horizon as the Maben soils. They are similar in the upper part of the solum to Providence soils but do not have fragipans and are underlain by clayey rather than loamy materials. Tippah soils are not as sandy as the Smithdale soils.

Udorthents

The Udorthents great group consists of soils so gullied that no diagnostic horizons are evident in the soil profile. These soils include those of the recently formed gully floor and gully walls that have eroded to the extent that the original soil is not recognizable. The gullies range from about 2 to 30 feet in depth. The floor of these gullies ranges from nearly level to V-shaped. Many of the gully walls are almost vertical. These soils are made up of silty to sandy, stratified materials that have accumulated in some nearly level drainageways. Narrow ridges of silty or sandy textured material form an intricate network throughout these soils.

The Udorthents great group is associated with most of the soils on uplands of the county, especially Loring, Memphis, Providence, and Smithdale.

Classification

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to the latest literature available (*6*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 19, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Haplaquents (*Hapl*, meaning simple horizons, plus *aquent*, the suborder of Entisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceeding the name of the great group. The adjective *Typic* identifies for the subgroup that is thought to typify the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, mixed, nonacid, thermic, Typic Haplaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Formation of the Soils

Discussed in this section are the factors that affect the formation of soils and the processes of soil formation.

Factors of soil formation.—The characteristics of the soil at any given point on the earth are determined by the nature of the parent material, climate, living organisms, relief, and time. All of these factors affect the formation of every soil. The relative importance of each differs from place to place. In extreme cases, one factor may dominate in the formation of the soil and fix most of its properties, as is common when the parent material consists of pure quartz sand. Little can happen to quartz sand, and the soils derived from it usually have faint horizons. Even in quartz sand, however, distinct profiles can be formed under certain types of vegetation where the topography is low and nearly level and the water table is high.

The five soil-forming factors are interdependent; each modifies the effects of the others. Climate and living organisms are the active factors of soil formation. They act on parent material and gradually change it into a natural body that has genetically related horizons. Relief largely controls runoff and therefore influences the effectiveness of climate and vegetation. Finally, time is needed to change parent material into a soil. The time needed for horizon differentiation may be much or little, but some time is always required. In most places a long time is required for the development of distinct horizons.

Parent material.—Water from the Gulf of Mexico covered the valley of the Mississippi River as far north as Cairo, Illinois, during the late Mesozoic and early Cenozoic eras of geologic time. The entire State of Mississippi, except small areas in Tishomingo County, was covered by water. Streams emptying into the gulf deposited layers of unconsolidated sand, clay, and silt.

After the water receded from the area that is now Yalobusha County, marine deposits were exposed and, during the Pleistocene age, layers of windblown silty material were deposited. This material is commonly called loess. Studies of all relationships tend to show that the loess is largely glacial rock flour that was carried southward and deposited by streams flowing from the melting ice. After the water receded, the dry rock flour was picked up by the wind from the flood plains of these streams and redeposited in an area extending from the flood plain of the Mississippi River to the top of the east wall of the river valley (*13*). This bank of loess originally covered the entire county. The deepest loess is along the western edge of the county.

Geologic erosion has removed much of the loess from the stronger slopes. In the eastern two-thirds of the county where the loess was originally thinner, only a cap of loess remains on some ridges, and Coastal Plain deposits are exposed on steep side slopes. The overlapping of the loess deposits on Coastal Plain deposits results in the formation of polygenetic soil profiles in some parts of the county. Where the overlying loess is shallow, the upper soil horizons have developed from weathered loess, and the lower horizons have developed from Coastal Plain material. Unweathered loess is noted for the uniformity of its physical and chemical composition. Other distinctive characteristics are the fine texture and irregular shape of its particles, its lack of coherence, and its ability to stand in almost vertical walls.

Alluvium is another kind of parent material from which the soils of Yalobusha County developed. Streams throughout the county have deposited alluvium on their flood plains. From this alluvium, some of the best soils in Yalobusha County have formed. Most of these areas still receive fresh deposits during each flood.

Climate.—The climate of Yalobusha County is of the humid, warm-temperature, continental type. It is characterized by rather warm summers and mild winters. The average temperature and normal rainfall distribution for the county are given in table 1.

The warm, moist weather that prevails most of the year favors rapid chemical reactions. The relatively high precipitation leaches the bases and other soluble materials and promotes the translocation of colloidal matter and other less soluble materials. Climate is the direct or indirect cause of variations in the kinds of plant and animal life and of the major differences that these variations have brought about in the development of soils. In the warm, humid climate of Yalobusha County, the more mature soils have been highly leached and the geologically young soils are being leached. Because the soils are frozen for only short periods during winter, translocation and leaching proceed without interruption throughout most of the year.

Living organisms.—The higher plants, micro-organisms, earthworms, and other forms that live on or in the soil are determined by the climate and many other factors. Living organisms are indispensable in soil development.

The organic matter that accumulates in the upper part of the soil from the decay of leaves and other parts of plants is changed into other chemical compounds by living organisms. The organic acids released by decomposition of the organic matter dissolve the slowly soluble mineral constituents and hasten the leaching and translocation of these inorganic materials. Climate also affects the kinds and amounts of vegetation and micro-organisms and the rate of chemical action and of leaching.

The native vegetation on the uplands of Yalobusha County consisted of hardwoods of the oak-hickory forest type. The flood plains of the county were covered primarily with oak, gum, and beech trees and a fairly

heavy undergrowth of vines and cane. The organic matter has been rapidly reduced by aerobic organisms in most soils in the hilly part of the county.

The forest cover and the warm humid climate have greatly contributed to the light color and small amount of organic matter in the soils. In undisturbed areas of the more mature soils, the material to a depth of 1/2 to 1 inch is generally dark and contains a large quantity of partly decayed leaves, twigs, and bark. Elsewhere, however, the environment does not allow the accumulation of large quantities of organic matter.

A vast number of organisms live in the soils of the county. Their existence depends on the soil conditions, particularly the food supply. The number of organisms constantly fluctuates because of multiplication and because of death, which is frequently caused by starvation. The total weight of living matter, including plant roots, in an acre of soil to plow layer depth is at least 5,000 pounds and in some soils is more than 10,000 pounds. Nearly all natural soil reactions are directly or indirectly biochemical .

Relief.—Soils of Yalobusha County range from nearly level to steep. The relief modifies the effects of climate and vegetation.

On some steep soils, runoff is so great that soil formation occurs at a slow pace. On these steep slopes, the quantity of water that percolates through the soil and the quantity of material leached and washed down are small.

In areas of nearly level soils and depressions where the water table is high, the soils are likely to be wet and gray. A fragipan forms in many of the soils that have broad, nearly level slopes. As the steepness of the slope increases, the thickness of the fragipan usually decreases. A pan seldom occurs in soils that have slopes of more than 15 percent.

Time.—Time is required for the development of soil from the parent material. The length of time required depends on the other factors involved. If the factors of soil formation have not operated long enough to form a soil that is nearly in equilibrium with the environment, the soil is considered young or immature.

The soils on the bottom lands are then youngest and do not have distinctly developed profile characteristics. Erosion regularly occurs on soils in the uplands, and the bottom lands frequently receive fresh deposits of sediment.

The soils in the uplands are the oldest and best developed or contain horizons that are most clearly expressed. These soils have developed characteristic properties and are essentially in equilibrium with their environment. Soils with steeper slopes, however, have less pronounced horizonation than soils with more gentle slopes.

Processes of soil formation.—Because of the wide range in parent material, relief, age, and biological activity, the soil-forming processes of Yalobusha County are complex. The soils of the county have changed greatly since the geologic ages thousands of years ago, when glacial rock flour was being deposited on much of this area by the westerly winds. The soil-forming processes have produced the soils as we now know them and are still very active. They have been working much longer on soils of the uplands than on soils of the flood plains. Consequently, the soils of the uplands are older and have stronger profile development than soils of the bottom lands.

The differences in the horizons of the soils in the county are caused by one or more processes. The main processes are the accumulation of organic matter, the leaching of carbonates and salts, the formation and translocation, of silicate clay minerals, and the reduction and transfer of iron.

Organic matter has accumulated in the top layer of the soils in the county to form an A horizon. A large amount of this organic matter is well decomposed material, or humus, but a considerable amount consists of living plants and other organisms.

Carbonates and salts have been leached from most soils in the county. Most soils in the area are acid, and their colloidal complexes are predominantly saturated with hydrogen ions.

The formation and translocation of silicate clay minerals, or eluviation, have affected all the soils in the county except the alluvial soils. Because alluvial soils are young, the processes that cause the formation and translocation of silicate clay minerals have not acted on them long enough to cause significant differences among layers. The A horizon of soils in the uplands in the county are eluviated and contain a small amount of clay. The illuviated B horizons contain an accumulation of clay. The results of eluviation, or downward movement of clay, can be identified as clay films on faces of peds and on the walls of root channels and wormholes or other holes. Some soils in the county have more than one sequum, that is, more than one eluvial horizon and its related illuvial horizon.

The reduction and transfer of iron have occurred in the poorly drained and somewhat poorly drained soils and to some extent in the lower part of the moderately well drained soils. This process is called gleying. It is more likely to occur in soils that are nearly level or are in depressions than in those that are sloping. In the nearly level or depressed areas, the restricted drainage results in reduced leaching, pronounced hydration, anaerobic biological activity, accumulation of organic acids, reduction of iron, and development of gray colors. Red, yellow, and brown colors generally occur in soils that are well oxidized. When the soil is not sufficiently aerated and oxidized, gleying occurs, and mottles and concretions of iron and manganese form.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single mapping unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Complex, soil. A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but

periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Excess alkali. Excess exchangeable sodium. The resulting poor physical properties restrict the growth of plants.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. Inadequate strength for supporting loads.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characterisitc that affects management. These differencees are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water of subsurface tunnels or pipelike cavities in the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slow intake. The slow movement of water into the soil.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.005 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturate zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Illustrations

Figure 1.—Landscape view of Collins-Oaklimeter Association. This soil area has high potential for production of crops, pasture and trees.

Figure 2.—High yields of cotton can be produced on Collins silt loam, occasionally flooded, one of Yalobusha County's better agricultural soils.

Figure 3.—Smithdale-Udorthents complex, gullied. This class VII land is better suited to trees than to other uses.

Figure 4.—Mulch planting of soybeans following combine. This type cropping system is effective in reducing erosion on sloping cropland.

Figure 5.—The Loring-Udorthents complex, gullied, in loblolly pine, which helps control erosion on many gullied areas throughout the county. This mapping unit has ordination symbol of 4r3.

Figure 6.—Sloped road bank ready for mulching and seeding. Soil physical properties are important to any grading or sloping of soils.

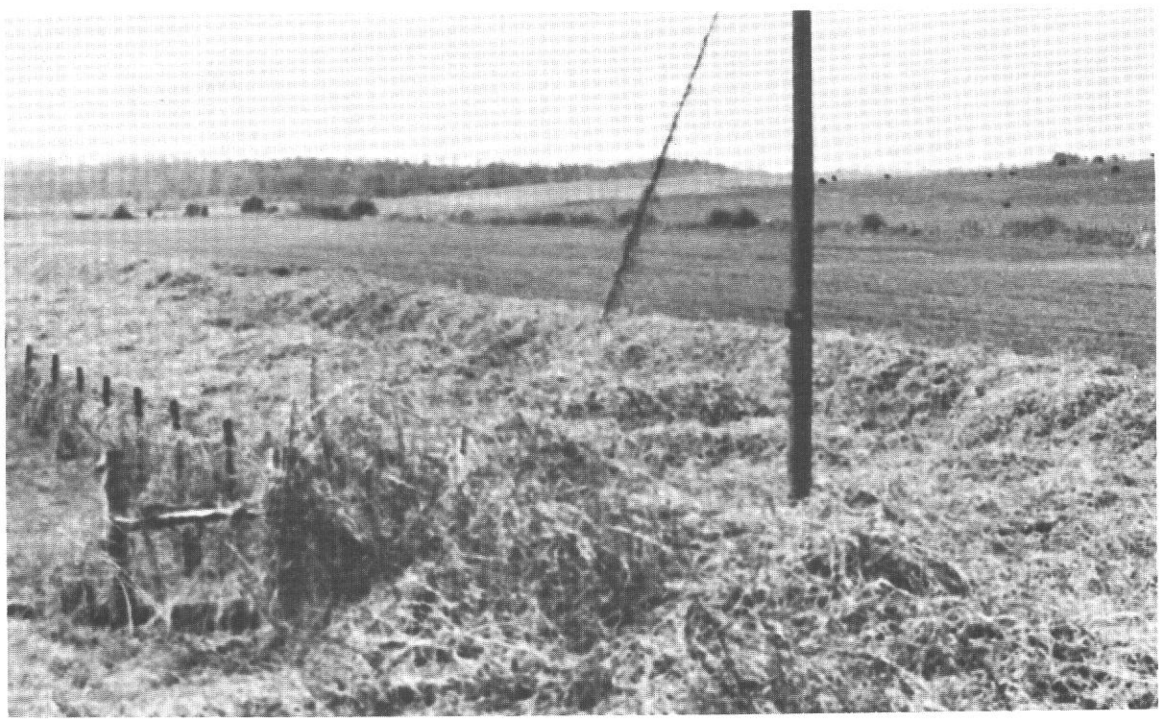

Figure 7.—Drainage ditch through Collins silt loam is well protected by good cover of Kudzu.

Figure 8.—Diversions, left, intercept hillside water and empty it safely into well protected "V" ditch on this Oaklimeter silt loam. This drainage system is important on all flood plains.

Figure 9.—View of Tillatoba Lake. This lake provides recreation in addition to flood protection.

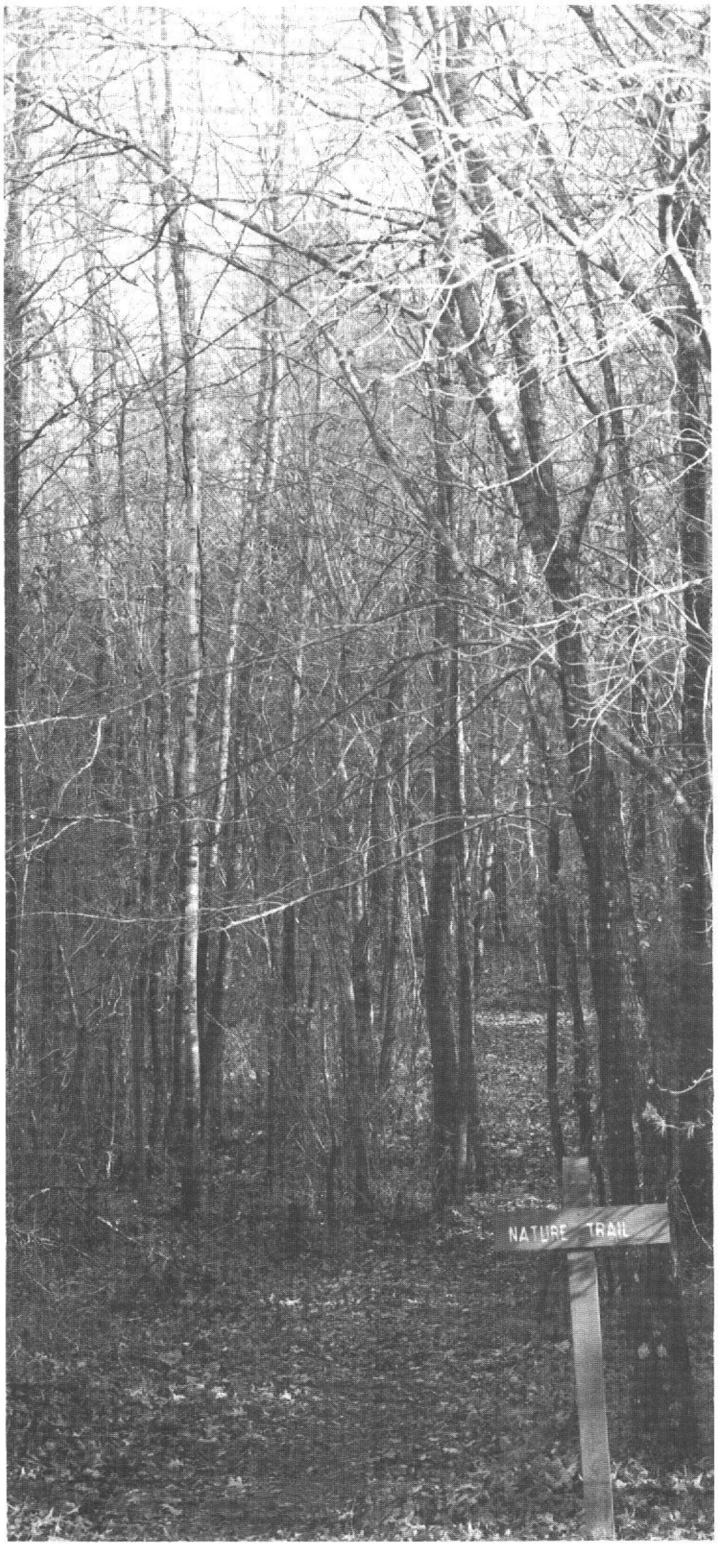

Figure 10.—Nature trail near Tillatoba Lake. Nature areas can be developed on almost any soil of the county.

Figure 11.—Profile of Providence silt loam. Mottled area in lower part is fragipan.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1931-60 at Water Valley weather station, Yalobusha County, Mississippi]

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	2 years in 10 will have at least 4 days with-- Maximum temperature equal to or higher than--	2 years in 10 will have at least 4 days with-- Minimum temperature equal to or lower than--	Average total	1 year in 10 will have-- Less than--	1 year in 10 will have-- More than--	Days with snow cover of 1 inch or more	Average depth of snow on days with snow cover
	F	F	F	F	In	In	In		In
January	55	34	74	18	5.64	2.14	10.13	1	4.7
February	59	37	72	21	5.14	2.57	8.83	(1)	2.4
March	65	42	79	26	6.23	3.30	9.34	(1)	2.0
April	75	51	86	36	5.20	2.42	7.91	0	0
May	82	58	92	45	3.92	2.05	6.07	0	0
June	90	67	98	59	3.86	1.37	6.47	0	0
July	93	70	100	64	4.57	1.65	7.66	0	0
August	93	69	101	61	3.09	.77	5.23	0	0
September	87	62	97	50	3.57	1.13	6.26	0	0
October	78	51	89	36	2.69	.64	5.58	0	0
November	65	41	78	24	4.60	1.92	7.47	0	0
December	56	36	73	19	5.25	2.51	9.65	(1)	3.0
Year	75	52	[2] 102	[3] 10	53.76	41.36	72.22	1	4.0

[1]Less than 0.5 a day.
[2]Average annual maximum.
[3]Average annual minimum.

TABLE 2.--PROBABILITIES OF LAST FREEZING TEMPERATURE IN SPRING AND FIRST IN FALL

[All data from Water Valley weather station, Yalobusha County, Mississippi]

Probability	Dates for given probability and temperature				
	24 degrees F	28 degrees F	32 degrees F	36 degrees F	40 degrees F
Spring:					
1 year in 10 later than	March 17	April 2	April 14	April 28	May 10
2 years in 10 later than	March 10	March 27	April 7	April 22	May 5
5 years in 10 later than	February 24	March 15	March 27	April 11	April 24
Fall:					
1 year in 10 earlier than	November 10	October 27	October 21	October 9	October 4
2 years in 10 earlier than	November 16	November 2	October 26	October 14	October 8
5 years in 10 earlier than	November 29	November 15	November 5	October 24	October 17

TABLE 3.--POTENTIALS AND LIMITATIONS OF SOIL ASSOCIATIONS FOR SPECIFIED USES

Association	Extent	Cultivated crops	Pasture and hayland	Woodland	Urban development	Intensive recreation areas	Recreation areas
	Pct						
1. Collins-Oaklimeter	11	High: wetness.	High	High	Low: floods.	Medium: floods.	High.
2. Oaklimeter-Gillsburg	9	High: wetness.	High	High	Low: floods.	Low: floods.	Medium: floods.
3. Arkabutla-Collins-Oaklimeter	4	Low: floods.	Medium: floods.	High	Low: floods.	Low: floods.	Low: floods.
4. Grenada-Calloway	2	High: wetness.	High	High	Medium: wetness.	High: percs slowly.	High.
5. Bonn-Gillsburg-Deerford	1	Medium: excess alkali.	Medium: excess alkali.	Medium: excess alkali.	Low: wetness.	Medium: wetness.	Medium: wetness.
6. Loring-Memphis	7	Medium: erosion.	High	High	Medium: low strength.	High: slope.	High.
7. Providence-Loring	4	Low: erosion.	High	High	Medium: slope.	Medium: slope.	High.
8. Smithdale-Providence	51	Low: slope.	Medium: slope.	High	Low: slope.	Low: slope.	Medium: slope.
9. Maben-Smithdale-Tippah	6	Low: slope.	Low: slope.	High	Low: slope, shrink-swell.	Low: slope.	Medium: slope.
10. Memphis-Loring-Providence	5	Low: slope.	Medium: slope.	High	Low: slope.	Low: slope.	Medium: slope.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ae	Ariel silt loam, occasionally flooded	1,820	0.6
Ar	Arkabutla silt loam, occasionally flooded	1,220	0.4
Au	Arkabutla silt loam, frequently flooded	4,972	1.7
Bo	Bonn silt loam	965	0.3
Br	Bruno sandy loam, occasionally flooded	1,250	0.4
Bu	Bruno sandy loam, frequently flooded	130	(1)
CaA	Calloway silt loam, 0 to 2 percent slopes	3,325	1.1
Cc	Cascilla silt loam, occasionally flooded	2,215	0.7
Cd	Cascilla silt loam, frequently flooded	345	0.1
Cn	Collins silt loam, occasionally flooded	17,730	5.9
Co	Collins silt loam, frequently flooded	3,800	1.3
De	Deerford complex	665	0.2
Ga	Gillsburg silt loam, occasionally flooded	8,310	2.8
Gb	Gillsburg silt loam, frequently flooded	500	0.2
GrA	Grenada silt loam, 0 to 2 percent slopes	2,215	0.7
GrB	Grenada silt loam, 2 to 5 percent slopes	5,540	1.9
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	2,690	0.9
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	4,430	1.5
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	5,210	1.8
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	1,330	0.4
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	6,735	2.2
LrE	Loring-Udorthents complex, gullied	3,280	1.1
MAE	Maben-Smithdale association, hilly	15,880	5.3
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	400	0.1
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	1,840	0.6
MeD3	Memphis silt loam, 8 to 12 percent slopes, severely eroded	1,075	0.4
MeE2	Memphis silt loam, 12 to 20 percent slopes, eroded	4,430	1.5
Oa	Oaklimeter silt loam, occasionally flooded	22,160	7.4
Ok	Oaklimeter silt loam, frequently flooded	3,658	1.2
PG	Pits	775	0.3
PrB2	Providence silt loam, 2 to 5 percent slopes, eroded	1,595	0.5
PrC2	Providence silt loam, 5 to 8 percent slopes, eroded	6,735	2.3
PrE2	Providence silt loam, 8 to 15 percent slopes, eroded	2,050	0.7
PrE3	Providence silt loam, 8 to 15 percent slopes, severely eroded	15,420	5.1
PvD3	Providence-Smithdale complex, 8 to 12 percent slopes, severely eroded	2,425	0.8
SdE2	Smithdale-Providence complex, 12 to 25 percent slopes, eroded	9,990	3.3
SmE	Smithdale-Udorthents complex, gullied	10,800	3.6
STF	Smithdale-Providence association, hilly	119,210	39.8
TaC2	Tippah silt loam, 5 to 8 percent slopes, eroded	575	0.2
TpD2	Tippah-Maben complex, 8 to 12 percent slopes, eroded	1,905	0.6
	Water	400	0.1
	Total	[2] 300,000	100.0

[1]Less than 0.1 percent.
[2]Does not include 22,560 acres in Enid and Grenada Reservoirs.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE PLANTS

[All yields were estimated for a high level of management in 1975. Absence of a yield figure indicates the crop is seldom grown or is not suited]

Soil name and map symbol	Cotton	Corn	Soybeans	Common bermuda-grass	Improved bermuda-grass	Bahiagrass	Tall fescue
	Lb	Bu	Bu	AUM[1]	AUM[1]	AUM[1]	AUM[1]
Ariel:							
Ae	800	110	40	9.0	11.0	11.0	10.0
Arkabutla:							
Ar	700	95	35	7.0	11.0	10.0	10.0
Au	---	---	20	6.0	8.0	---	---
Bonn:							
Bo	---	---	15	4.0	---	4.5	---
Bruno:							
Br	400	50	---	3.5	---	---	---
Bu	---	---	---	3.5	---	---	---
Calloway:							
CaA	600	85	35	6.0	9.0	8.5	8.0
Cascilla:							
Cc	850	110	40	9.0	12.0	11.0	10.5
Cd	---	---	35	7.0	8.0	---	---
Collins:							
Cn	800	110	40	9.0	12.0	11.0	10.0
Co	---	---	35	6.0	7.0	---	---
Deerford:							
De	---	---	25	6.5	---	7.5	---
Gillsburg:							
Ga	650	90	35	7.0	10.0	10.0	9.0
Gb	---	---	30	6.0	8.0	---	---
Grenada:							
GrA	625	90	35	6.0	9.5	8.5	8.5
GrB	550	65	30	6.0	9.0	8.5	7.5
Loring:							
LoB2	700	90	30	7.5	10.0	8.5	8.5
LoC2	650	70	25	6.5	9.0	8.0	7.5
LoC3	600	65	20	6.0	6.5	8.0	---
LoD2	500	60	20	6.5	8.0	8.0	7.0
LoD3	---	---	---	5.0	6.5	8.0	---
Loring-Udorthents complex, gullied:							
LrE	---	---	---	---	---	---	---
Maben-Smithdale:							
MAE	---	---	---	---	---	---	---
Memphis:							
MeB2	750	90	35	7.5	10.0	8.5	8.5
MeC2	700	80	30	7.0	9.0	8.0	7.5
MeD3	---	---	---	6.0	6.5	8.0	---
MeE2	---	---	---	5.0	6.5	8.0	---

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE PLANTS--Continued

Soil name and map symbol	Cotton	Corn	Soybeans	Common bermuda-grass	Improved bermuda-grass	Bahiagrass	Tall fescue
	Lb	Bu	Bu	AUM[1]	AUM[1]	AUM[1]	AUM[1]
Oaklimeter:							
Oa	750	105	40	9.0	11.0	11.0	10.0
Ok	---	---	35	6.0	7.0	---	---
Providence:							
PrB2	700	80	35	7.5	9.5	8.5	8.5
PrC2	650	70	30	6.5	9.0	8.0	7.5
PrE2	---	---	---	5.0	8.0	8.0	---
PrE3	---	---	---	5.0	6.5	8.0	---
PvD3, Providence part	---	---	---	5.0	6.5	---	---
Smithdale part	---	---	---	4.5	6.5	---	---
Smithdale: SdE2:							
Smithdale part	---	---	---	4.5	8.0	---	---
Providence part	---	---	---	4.5	8.0	8.0	---
Smithdale-Udorthents complex, gullied: SmE	---	---	---	---	---	---	---
Smithdale-Providence association, hilly: STF	---	---	---	---	---	---	---
Tippah:							
TaC2	600	70	30	6.0	9.0	8.5	7.5
TpD2, Maben part	---	---	---	6.0	7.0	6.0	---
Tippah part	---	---	---	6.0	7.0	7.0	---

[1]Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column means the information was not available]

Soil name and map symbol	Suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Ariel:								
Ae	1o7	Slight	Slight	Slight	Moderate	Cherrybark oak	110	Cherrybark oak, eastern cottonwood, loblolly pine, yellow-poplar, sweetgum.
						Eastern cottonwood	115	
						Loblolly pine	95	
						Yellow-poplar	110	
						Sweetgum	100	
Arkabutla:								
Ar	1w8	Slight	Moderate	Slight	Moderate	Cherrybark oak	105	Cherrybark oak, eastern cottonwood, green ash, loblolly pine, sweetgum, American sycamore.
						Eastern cottonwood	110	
						Green ash	95	
						Loblolly pine	100	
						Nuttall oak	110	
						Sweetgum	100	
						Water oak	100	
						Willow oak	100	
Au	1w9	Slight	Severe	Moderate	Moderate	Cherrybark oak	105	Cherrybark oak, eastern cottonwood, green ash, loblolly pine, sweetgum, American sycamore.
						Eastern cottonwood	110	
						Green ash	95	
						Loblolly pine	100	
						Nuttall oak	110	
						Sweetgum	100	
						Water oak	100	
Bonn:								
Bo	5t3	Slight	Severe	Severe	Moderate	Eastern redcedar	---	Eastern redcedar.
Bruno:								
Br, Bu	2s5	Slight	Moderate	Moderate	Moderate	Cherrybark oak	116	Cherrybark oak, Shumard oak, chestnut oak, willow oak, sweetgum, yellow-poplar.
						Water oak	105	
						Sweetgum	110	
						Willow oak	88	
Calloway:								
CaA	2w8	Slight	Moderate	Slight	Moderate	Cherrybark oak	90	Cherrybark oak, Shumard oak, sweetgum, water oak, yellow-poplar.
						Loblolly pine	90	
						Shortleaf pine	80	
						Sweetgum	90	
						Water oak	90	
Cascilla:								
Cc	1o7	Slight	Slight	Slight	Moderate	Cherrybark oak	112	Cherrybark oak, eastern cottonwood, loblolly pine, nuttall oak, sweetgum, American sycamore, yellow-poplar.
						Eastern cottonwood	110	
						Green ash	90	
						Loblolly pine	93	
						Nuttall oak	114	
						Water oak	104	
						Sweetgum	102	
						Yellow-poplar	115	
Cd	1w8	Slight	Moderate	Moderate	Moderate	Cherrybark oak	112	Cherrybark oak, eastern cottonwood, loblolly pine, nuttall oak, sweetgum, American sycamore, yellow-poplar.
						Eastern cottonwood	110	
						Green ash	90	
						Loblolly pine	93	
						Nuttall oak	113	
						Water oak	104	
						Sweetgum	102	
						Yellow-poplar	115	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Suitability group	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Important trees	Site index	Trees to plant
Collins:								
Cn	1o7	Slight	Slight	Slight	Moderate	Green ash	95	Green ash, eastern cottonwood, cherrybark oak.
						Eastern cottonwood	115	
						Cherrybark oak	110	
Co	1w8	Slight	Moderate	Moderate	Moderate	Shumard oak	105	Shumard oak, loblolly pine, sweetgum.
						Loblolly pine	95	
						Sweetgum	105	
Deerford:								
De	2w8	Slight	Moderate	Slight	Moderate	Sweetgum	86	Loblolly pine.
						Loblolly pine	92	
						Water oak	82	
Gillsburg:								
Ga	2w8	Slight	Moderate	Moderate	Moderate	Cherrybark oak	100	Eastern cottonwood, loblolly pine, sweetgum, American sycamore, yellow-poplar.
						Eastern cottonwood	105	
						Green ash	85	
						Loblolly pine	90	
						Sweetgum	90	
						American sycamore	105	
						Water oak	95	
						Yellow-poplar	105	
Gb	2w9	Slight	Severe	Moderate	Moderate	Cherrybark oak	100	Eastern cottonwood, loblolly pine, sweetgum, American sycamore, yellow-poplar.
						Eastern cottonwood	105	
						Green ash	85	
						Loblolly pine	90	
						Sweetgum	90	
						American sycamore	105	
						Water oak	95	
						Yellow-poplar	105	
Grenada:								
GrA, GrB	3o7	Slight	Slight	Slight	Slight	Cherrybark oak	85	Cherrybark oak, Shumard oak, water oak, loblolly pine, white oak, shortleaf pine, slash pine, sweetgum.
						Southern red oak	80	
						Loblolly pine	85	
						Shortleaf pine	75	
						Sweetgum	80	
Loring:								
LoB2, LoC2, LoC3, LoD2, LoD3	3o7	Slight	Slight	Slight	Slight	Cherrybark oak	86	Loblolly pine, yellow-poplar, southern red oak.
						Sweetgum	90	
						Southern red oak	74	
						Loblolly pine	85	
						Water oak	82	
Loring-Udorthents complex, gullied:								
[1]LrE	4r3	Severe	Severe	Severe	Severe	Loblolly pine	---	Loblolly pine, shortleaf pine.
						Shortleaf pine	---	
Maben:								
[1]MAE:								
Maben part	3c2	Slight	Moderate	Moderate	Moderate	Loblolly pine	83	Loblolly pine, shortleaf pine.
						Shortleaf pine	73	
Smithdale part	3o2	Slight	Slight	Slight	Moderate	Loblolly pine	80	Loblolly pine.
						Shortleaf pine	69	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Memphis: MeB2, MeC2, MeD3, MeE2	2o7	Slight	Slight	Slight	Slight	Cherrybark oak Loblolly pine Sweetgum Water oak	90 90 90 90	Cherrybark oak, loblolly pine, sweetgum, yellow-poplar.
Oaklimeter: Oa	1o7	Slight	Slight	Slight	Moderate	Cherrybark oak Eastern cottonwood Green ash Loblolly pine Nuttall oak Willow oak Sweetgum	100 100 90 90 100 100 100	Cherrybark oak, eastern cottonwood, loblolly pine, nuttall oak, sweetgum, water oak, yellow-poplar.
Ok	1w8	Slight	Moderate	Moderate	Moderate	Cherrybark oak Eastern cottonwood Green ash Loblolly pine Sweetgum Nuttall oak	100 100 90 90 100 100	Cherrybark oak, eastern cottonwood, loblolly pine, nuttall oak, sweetgum.
Providence: PrB2, PrC2, PrE2, PrE3	3o7	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Sweetgum	90 64 90	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
[1]PvD3: Providence part	3o7	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Sweetgum	84 64 84	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
Smithdale part, see Smithdale.								
Smithdale: [1]SdE2, [1]STF: Smithdale part	3o2	Slight	Slight	Slight	Moderate	Loblolly pine Shortleaf pine	80 69	Loblolly pine.
Providence part	3o7	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Sweetgum	84 64 90	Loblolly pine. Shumard oak, sweetgum oak, yellow-poplar.
Smithdale-Udorthents complex, gullied: [1]SmE	4r3	Severe	Severe	Severe	Severe	Loblolly pine Shortleaf pine	--- ---	Loblolly pine, shortleaf pine.
Tippah: TaC2	3o7	Slight	Slight	Slight	Moderate	Cherrybark oak Shumard oak White oak Loblolly pine Sweetgum Yellow-poplar	95 95 80 78 90 90	Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar.
[1]TpD2: Tippah part	3o7	Slight	Slight	Slight	Moderate	Cherrybark oak Shumard oak White oak Loblolly pine Sweetgum Yellow-poplar	95 95 80 78 90 90	Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar.
Maben part	3c2	Slight	Moderate	Slight	Slight	Loblolly pine Shortleaf pine	83 73	Loblolly pine, shortleaf pine.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 7.--BUILDING SITE DEVELOPMENT

["Shrink-swell" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe". Absence of an entry means soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Ariel:					
Ae	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Arkabutla:					
Ar, Au	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, corrosive.	Severe: floods, low strength.
Bonn:					
Bo	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Bruno:					
Br, Bu	Severe: floods, too sandy.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Calloway:					
CaA	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, corrosive.	Moderate: wetness, low strength.
Cascilla:					
Cc, Cd	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Collins:					
Cn, Co	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Deerford:					
De	Severe: percs slowly, wetness.	Moderate: wetness, low strength, shrink-swell.	Severe: wetness.	Moderate: wetness, low strength, shrink-swell.	Moderate: low strength, shrink-swell.
Gillsburg:					
Ga, Gb	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, corrosive.	Severe: floods.
Grenada:					
GrA, GrB	Moderate: wetness, low strength.	Moderate: wetness, low strength.	Moderate: wetness, low strength.	Moderate: corrosive, wetness, low strength.	Moderate: low strength, wetness.
Loring:					
LoB2	Moderate: low strength, wetness.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.
LoC2, LoC3	Moderate: low strength, wetness.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Moderate: low strength.
LoD2, LoD3	Moderate: slope, low strength.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Moderate: slope, low strength.
Loring-Udorthents complex, gullied:					
[1]LrE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 7.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Maben:					
[1]MAE:					
Maben part	Severe: too clayey, slope.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.
Smithdale part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Memphis:					
MeB2	Slight	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.
MeC2	Slight	Moderate: low strength.	Moderate: low strength.	Moderate: low strength, slope.	Moderate: low strength.
MeD3	Moderate: slope.	Moderate: low strength, slope.	Moderate: low strength, slope.	Severe: slope.	Moderate: low strength, slope.
MeE2	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Oaklimeter:					
Oa, Ok	Severe: floods.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.
Providence:					
PrB2, PrC2	Moderate: wetness.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Moderate: low strength.
PrE2, PrE3	Moderate: wetness, slope.	Moderate: low strength, slope.	Moderate: low strength, slope.	Severe: slope.	Moderate: low strength, slope.
[1]PvD3:					
Providence part	Moderate: wetness, slope.	Moderate: low strength, slope.	Moderate: low strength, slope.	Severe: slope.	Moderate: low strength, slope.
Smithdale part	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Smithdale:					
[1]SdE2, [1]STF:					
Smithdale part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Providence part	Moderate: slope.	Moderate: low strength, slope.	Moderate: low strength, slope.	Severe: slope.	Moderate: low strength, slope.
Smithdale-Udorthents complex, gullied:					
[1]SmE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tippah:					
TaC2	Severe: too clayey.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell, corrosive.	Severe: low strength, shrink-swell.
[1]TpD2:					
Tippah part	Severe: too clayey.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell, corrosive.	Severe: low strength, shrink-swell.
Maben part	Moderate: too clayey, slope.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: slope.	Severe: shrink-swell, slope.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 8.--SANITARY FACILITIES

["Percs slowly" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe" used to rate soils. Absence of an entry means soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ariel:					
Ae	Severe: floods, percs slowly.	Severe: floods.	Severe: floods.	Severe: floods.	Good.
Arkabutla:					
Ar, Au	Severe: floods, wetness.	Moderate: seepage.	Severe: floods, wetness.	Severe: floods, wetness.	Fair: too clayey.
Bonn:					
Bo	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Bruno:					
Br, Bu	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Poor: too sandy.
Calloway:					
CaA	Severe: percs slowly, wetness.	Slight	Moderate: wetness, percs slowly.	Moderate: wetness.	Good.
Cascilla:					
Cc, Cd	Severe: floods.	Moderate: seepage.	Severe: floods.	Severe: floods.	Good.
Collins:					
Cn, Co	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Good.
Deerford:					
De	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Fair: too clayey.
Gillsburg:					
Ga, Gb	Severe: floods, wetness.	Slight	Severe: floods, wetness.	Severe: floods, wetness.	Good.
Grenada:					
GrA	Severe: percs slowly.	Slight	Moderate: wetness, percs slowly.	Moderate: wetness.	Good.
GrB	Severe: percs slowly.	Moderate: slope.	Moderate: wetness, percs slowly.	Moderate: wetness.	Good.
Loring:					
LoB2, LoC2, LoC3	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
LoD2, LoD3	Severe: percs slowly.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
Loring-Udorthents complex, gullied:					
[1]LrE	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 8.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Maben:					
[1]MAE:					
Maben part	Severe: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: too clayey, slope.
Smithdale part	Severe: slope.	Severe: seepage, slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Memphis:					
MeB2, MeC2	Slight	Moderate: seepage, slope.	Slight	Slight	Fair: too clayey.
MeD3	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.	Fair: too clayey, slope.
MeE2	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Oaklimeter:					
Oa, Ok	Severe: floods, wetness.	Moderate: seepage.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
Providence:					
PrB2, PrC2	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
PrE2, PrE3	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
[1]PvD3:					
Providence part	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
Smithdale part	Moderate: slope.	Severe: seepage, slope.	Slight	Moderate: slope.	Fair: slope.
Smithdale:					
[1]SdE2, [1]STF:					
Smithdale part	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: slope.
Providence part	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
Smithdale-Udorthents complex, gullied:					
[1]SmE	Severe: slope.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope.
Tippah:					
TaC2	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Severe: wetness.	Poor: too clayey.
[1]TpD2:					
Tippah part	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Severe: wetness.	Poor: too clayey.
Maben part	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 9.--CONSTRUCTION MATERIALS

["Shrink-swell" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry means soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ariel:				
Ae	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Arkabutla:				
Ar, Au	Fair: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Bonn:				
Bo	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, excess alkali.
Bruno:				
Br, Bu	Good	Fair: excess fines.	Unsuited: excess fines.	Poor: too sandy.
Calloway:				
CaA	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Cascilla:				
Cc, Cd	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Collins:				
Cn, Co	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Deerford:				
De	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layers.
Gillsburg:				
Ga, Gb	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Grenada:				
GrA, GrB	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Loring:				
LoB2, LoC2, LoC3, LoD2, LoD3	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Loring-Udorthents complex, gullied:				
[1]LrE	Fair: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, slope.
Maben:				
[1]MAE:				
Maben part	Poor: shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Smithdale part	Fair: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 9.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Memphis:				
MeB2, MeC2	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
MeD3	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, slope.
MeE2	Fair: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Oaklimeter:				
Oa, Ok	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Providence:				
PrB2, PrC2, PrE2, PrE3	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
[1]PvD3:				
Providence part	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Smithdale part	Good	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
Smithdale:				
[1]SdE2, [1]STF:				
Smithdale part	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Providence part	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Smithdale-Udorthents complex, gullied:				
[1]SmE	Fair: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, slope.
Tippah:				
TaC2	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
[1]TpD2:				
Tippah part	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Maben part	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 10.--WATER MANAGEMENT

["Seepage" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ariel: Ae	Moderate: seepage.	Moderate: piping, unstable fill.	Cutbanks cave, floods.	Floods	Erodes easily	Erodes easily.
Arkabutla: Ar, Au	Moderate: seepage.	Moderate: piping, low strength.	Cutbanks cave, floods.	Erodes easily, floods, slow intake.	Erodes easily, piping, wetness.	Erodes easily.
Bonn: Bo	Slight	Moderate: piping, erodes easily.	Cutbanks cave, excess alkali, percs slowly.	Droughty, excess alkali, wetness.	Not needed	Droughty, erodes easily, excess alkali.
Bruno: Br, Bu	Severe: seepage.	Moderate: piping, low strength.	Not needed	Floods droughty, seepage.	Not needed	Droughty.
Calloway: CaA	Slight	Moderate: piping, compressible, low strength.	Cutbanks cave, percs slowly, slope.	Percs slowly, erodes easily, slope.	Percs slowly, erodes easily, piping.	Percs slowly, erodes easily, slope.
Cascilla: Cc, Cd	Moderate: seepage.	Moderate: piping, low strength.	Cutbanks cave	Floods	Erodes easily, piping.	Erodes easily.
Collins: Cn, Co	Moderate: seepage.	Moderate: piping, unstable fill.	Cutbanks cave, floods.	Erodes easily, floods.	Erodes easily, piping.	Erodes easily.
Deerford: De	Slight	Moderate: piping, compressible, erodes easily.	Cutbanks cave, percs slowly.	Excess alkali, percs slowly.	Not needed	Excess alkali, erodes easily.
Gillsburg: Ga, Gb	Moderate: seepage.	Moderate: compressible, piping, unstable fill.	Floods, wetness.	Floods, wetness, slow intake.	Wetness: erodes easily, piping.	Wetness, erodes easily.
Grenada: GrA	Slight	Moderate: piping, low strength.	Slope	Slow intake	Erodes easily, percs slowly.	Erodes easily.
GrB	Slight	Moderate: piping, low strength.	Not needed	Slow intake, erodes easily.	Erodes easily, slope.	Erodes easily, slope.
Loring: LoB2, LoC2, LoC3, LoD2, LoD3	Moderate: seepage.	Moderate: piping, low strength.	Not needed	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
Loring-Udorthents complex, gullied: [1]LrE	Severe: slope.	Severe: low strength, erodes easily.	Slope: erodes easily.	Slope: erodes easily.	Slope: erodes easily.	Slope: erodes easily.

See footnote at end of table.

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments dikes and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Maben:						
[1]MAE:						
Maben part	Moderate: seepage.	Severe: low strength.	Slope	Slow intake, complex slope.	Slope: erodes easily.	Percs slowly, slope.
Smithdale part	Severe: seepage.	Moderate: piping, unstable fill.	Slope	Fast intake, seepage, complex slope.	Slope: erodes easily.	Slope: erodes easily.
Memphis:						
MeB2, MeC2, MeD3, MeE2	Moderate: seepage.	Moderate: piping, erodes easily.	Not needed	Erodes easily, slope.	Erodes easily, slope, piping.	Erodes easily, slope.
Oaklimeter:						
Oa, Ok	Moderate: seepage.	Moderate: piping, low strength.	Floods, wetness.	Floods, wetness.	Erodes easily, piping.	Piping.
Providence:						
PrB2, PrC2, PrE2, PrE3	Slight	Moderate: piping, unstable fill.	Percs slowly: slope.	Erodes easily, percs slowly, slope.	Erodes easily, percs slowly, piping.	Erodes easily, percs slowly, slope.
[1]PvD3:						
Providence part	Slight	Moderate: piping, unstable fill.	Percs slowly: slope.	Erodes easily, percs slowly, slope.	Erodes easily, percs slowly, piping.	Erodes easily, percs slowly, slope.
Smithdale part	Severe: seepage.	Moderate: piping, unstable fill.	Slope	Fast intake, seepage, complex slope.	Slope, erodes easily.	Slope, erodes easily.
Smithdale:						
[1]SdE2, [1]STF:						
Smithdale part	Severe: seepage.	Moderate: piping, unstable fill.	Slope	Fast intake, seepage, complex slope.	Slope, erodes easily.	Slope, erodes easily.
Providence part	Slight	Moderate: piping, unstable fill.	Percs slowly: slope.	Erodes easily, percs slowly, slope.	Erodes easily, percs slowly, piping.	Erodes easily, percs slowly, slope.
Smithdale-Udorthents complex, gullied:						
[1]SmE	Severe: slope.	Severe: erodes easily.	Slope: erodes easily.	Slope: erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Tippah:						
TaC2	Slight	Moderate: shrink-swell, piping.	Percs slowly: slope.	Percs slowly, slope.	Erodes easily, percs slowly, slope.	Erodes easily, percs slowly, slope.
[1]TpD2:						
Tippah part	Slight	Moderate: shrink-swell, piping.	Percs slowly: slope.	Percs slowly, slope.	Erodes easily, percs slowly, slope.	Erodes easily, percs slowly, slope.
Maben part	Moderate: seepage.	Severe: low strength. piping.	Slope	Complex slope, slow intake.	Slope, erodes easily.	Slope, percs slowly.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 11.--RECREATIONAL DEVELOPMENT

["Percs slowly" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Ariel:				
Ae	Severe: floods.	Severe: floods.	Severe: floods.	Slight.
Arkabutla:				
Ar, Au	Severe: floods, wetness.	Moderate: floods, wetness.	Severe: floods, wetness.	Moderate: floods, wetness.
Bonn:				
Bo	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Bruno:				
Br, Bu	Severe: floods.	Severe: floods.	Severe: floods.	Slight.
Calloway:				
CaA	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Cascilla:				
Cc, Cd	Severe: floods.	Severe: floods.	Severe: floods.	Slight.
Collins:				
Cn, Co	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight.
Deerford:				
De	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Gillsburg:				
Ga, Gb	Severe: floods, wetness.	Moderate: floods, wetness.	Severe: floods, wetness.	Moderate: floods, wetness.
Grenada:				
GrA, GrB	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: percs slowly, wetness.	Slight.
Loring:				
LoB2	Slight	Slight	Moderate: slope.	Slight.
LoC2, LoC3	Slight	Slight	Severe: slope.	Slight.
LoD2, LoD3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Loring-Udorthents complex, gullied:				
[1]LrE	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Maben:				
[1]MAE:				
Maben part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Smithdale part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT-Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Memphis:				
MeB2	Slight	Slight	Moderate: slope.	Slight.
MeC2	Slight	Slight	Severe: slope.	Slight.
MeD3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
MeE2	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Oaklimeter:				
Oa, Ok	Severe: floods, wetness.	Moderate: floods, wetness.	Severe: floods.	Slight.
Providence:				
PrB2	Slight	Slight	Moderate: slope.	Slight.
PrC2	Slight	Slight	Severe: slope.	Slight.
PrE2, PrE3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
[1]PvD3:				
Providence part	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Smithdale part	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Smithdale:				
[1]SdE2, [1]STF:				
Smithdale part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Providence part	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Smithdale-Udorthents complex, gullied:				
[1]SmE	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Tippah:				
TaC2	Moderate: percs slowly.	Slight	Severe: slope.	Slight.
[1]TpD2:				
Tippah part	Moderate: percs slowly.	Moderate: slope.	Severe: slope.	Slight.
Maben part	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 12.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates the soil was not rated]

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Ariel:										
Ae	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Arkabutla:										
Ar	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Au	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Bonn:										
Bo	Poor	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Fair.
Bruno:										
Br, Bu	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Calloway:										
CaA	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Cascilla:										
Cc	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Cd	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Collins:										
Cn	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Co	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
Deerford:										
De	Fair	Fair	Good	---	Good	Fair	Fair	Good	Good	Good.
Gillsburg:										
Ga	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Gb	Poor	Fair	Fair	Good	Good	Fair	Fair	Good	Fair	Fair.
Grenada:										
GrA, GrB	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Loring:										
LoB2	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC2, LoC3, LoD2, LoD3	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Loring-Udorthents complex, gullied:										
[1]LrE	---	---	---	---	---	---	---	---	---	---
Maben:										
[1]MAE:										
Maben part	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Smithdale part	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Memphis:										
MeB2	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MeC2, MeD3	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MeE2	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Oaklimeter:										
Oa	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ok	Poor	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
Providence:										
PrB2	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PrC2, PrE2, PrE3	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]PvD3:										
Providence part	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Smithdale part	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Smithdale:										
[1]SdE2, [1]STF:										
Smithdale part	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Providence part	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Smithdale-Udorthents complex, gullied:										
[1]SmE	---	---	---	---	---	---	---	---	---	---
Tippah:										
TaC2	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
[1]TpD2:										
Tippah part	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Maben part	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means greater than. Absence of an entry means data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Ariel:											
Ae----------------	0-32	Silt loam-------	ML, CL-ML	A-4	0	100	100	90-100	85-95	<30	NP-7
	32-60	Silt loam, loam	ML, CL, CL-ML	A-4	0	100	100	85-100	70-90	<30	NP-10
Arkabutla:											
Ar, Au------------	0-7	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	85-100	60-95	25-35	7-15
	7-48	Silty clay loam, loam, silt loam.	CL	A-6, A-7	0	100	100	85-100	70-90	30-45	12-25
Bonn:											
Bo----------------	0-13	Silt loam, very fine sandy loam	ML, CL-ML	A-4	0	100	100	95-100	75-100	20-30	2-7
	13-49	Silt loam, silty clay loam.	CL	A-6	0	95-100	90-100	85-100	65-100	30-40	12-22
	49-80	Silt loam, silty clay loam.	CL, ML	A-6, A-4	0	100	95-100	90-100	75-100	28-38	8-18
Bruno:											
Br, Bu------------	0-9	Sandy loam, loamy sand, loam.	SM, ML	A-2, A-4	0	100	100	60-85	30-60	<25	NP-3
	9-41	Sand, loamy sand	SP-SM, SM	A-2	0	100	100	60-80	10-30	<20	NP-3
	41-60	Sand------------	SP-SM, SM	A-2, A-3	0	100	100	50-70	5-20	<20	NP-3
Calloway:											
CaA---------------	0-23	Silt loam-------	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
	23-53	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-95	30-40	12-20
	53-70	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
Cascilla:											
Cc, Cd------------	0-59	Silt loam-------	CL	A-4, A-6	0	100	100	95-100	85-95	28-39	9-18
	59-72	Fine sandy loam, loam, silt loam.	SM, ML, CL-ML, SM-SC	A-4	0	100	100	80-95	45-85	<20	NP-5
Collins:											
Cn, Co------------	0-55	Silt loam, loam, very fine sandy loam.	ML, CL, CL-ML	A-4	0	100	100	85-95	75-100	<35	NP-10
Deerford:											
De----------------	0-8	Silt loam-------	ML, CL-ML	A-4	0	100	100	100	95-100	<28	NP-7
	8-43	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	100	95-100	32-45	11-21
	43-60	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	25-40	5-17
Gillsburg:											
Ga, Gb------------	0-35	Silt loam-------	CL-ML, CL	A-4	0	100	100	100	95-100	20-28	5-10
	35-60	Silt loam, loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	20-38	5-16
Grenada:											
GrA, GrB----------	0-7	Silt loam-------	ML, CL-ML	A-4	0	100	100	100	90-100	27-31	4-6
	7-26	Silt loam-------	CL	A-6	0	100	100	100	90-100	28-35	11-15
	26-30	Silt loam-------	ML, CL, CL-ML	A-4	0	100	100	100	90-100	20-30	5-10
	30-52	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-42	15-21

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Loring: LoB2, LoC2, LoC3, LoD2, LoD3, [1]LrE--	0-3	Silt loam-------	ML, CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	20-35	4-15
	3-31	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	90-100	35-45	15-25
	31-65	Silt loam-------	CL, ML	A-4, A-6, A-7	0	100	100	95-100	90-100	30-45	8-18
Maben: [1]MAE:											
Maben part--------	0-4	Fine sandy loam	SM, SM-SC	A-6	0	95-100	90-100	70-85	36-50	<30	NP-7
	4-35	Clay, silty clay, clay loam	MH, CH	A-7	0	95-100	90-100	90-100	75-95	50-80	18-40
	35-72	Stratified weathered, bedrock to loam	CL, CH	A-4, A-6 A-7	0	95-100	80-95	70-90	60-75	30-62	10-21
Smithdale part----	0-14	Loamy sand------	SM	A-2	0	100	85-100	50-75	15-30	<20	NP-5
	14-45	Clay loam, sandy clay loam, loam	SM-SC, SC, CL, CL-ML	A-4, A-6 A-7	0	100	85-100	80-95	45-75	23-41	7-27
	45-70	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
Memphis: MeB2, MeC2, MeD3, MeE2--------------	0-4	Silt loam-------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	4-38	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-48	15-25
	38-60	Silt loam-------	ML, CL	A-4, A-6	0	100	100	100	90-100	30-40	6-15
Oaklimeter: Oa, Ok------------	0-6	Silt loam, very fine sandy loam	ML, CL, CL-ML	A-4	0	100	100	90-100	70-90	<30	NP-8
	6-27	Very fine sandy loam, silt loam, loam.	ML, CL, CL-ML	A-4	0	100	100	85-95	60-85	<30	NP-8
	27-70	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4	0	100	100	90-100	90-100	<30	NP-10
Providence: PrB2, PrC2, PrE2, PrE3--------------	0-2	Silt loam-------	ML, CL	A-4	0	100	100	100	85-100	<30	NP-10
	2-19	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	19-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	36-54	Loam, clay loam, sandy clay loam.	CL, SM, SC	A-6, A-4	0	100	95-100	70-95	40-80	15-35	8-18
	54-80	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	95-100	60-85	30-80	<30	NP-10
[1]PvD3: Providence part--	0-2	Silt loam-------	ML, CL,	A-4	0	100	100	100	85-100	<30	NP-10
	2-19	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	19-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	36-54	Loam, clay loam, sandy clay loam.	CL, SM, SC	A-6, A-4	0	100	95-100	70-95	40-80	15-35	8-18
	54-80	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	95-100	60-85	30-80	<30	NP-10

See footnote at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Providence:											
Smithdale part---	0-14	Loamy sand------	SM	A-2	0	100	85-100	50-75	15-30	<30	NP-5
	14-45	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4, A-7	0	100	85-100	80-95	45-75	23-41	7-27
	45-70	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
Smithdale: [1]SdE2, [1]SmE, [1]STF:											
Smithdale part---	0-14	Loamy sand------	SM	A-2	0	100	85-100	50-75	15-30	<30	NP-5
	14-45	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4, A-7	0	100	85-100	80-95	45-75	23-41	7-27
	45-70	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
Providence part--	0-2	Silt loam-------	ML, CL	A-4	0	100	100	100	85-100	<30	NP-10
	2-19	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	19-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	36-54	Loam, clay loam, sandy clay loam.	CL, SM, SC	A-6, A-4	0	100	95-100	70-95	40-80	15-35	8-18
	54-80	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	95-100	60-85	30-80	<30	NP-10
Tippah:											
TaC2-------------	0-6	Silt loam, loam	CL, CL-ML	A-4	0	100	100	90-100	70-90	20-30	4-10
	6-30	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	98-100	90-100	85-95	30-45	11-22
	30-72	Silty clay loam, silty clay, clay.	CH, MH	A-7	0	100	99-100	80-100	60-95	50-65	25-40
[1]TpD2:											
Tippah part------	0-6	Silt loam, loam	CL, CL-ML	A-4	0	100	100	90-100	70-90	20-30	4-10
	6-30	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	98-100	90-100	85-95	30-45	11-22
	30-72	Silty clay loam, silty clay, clay.	CH, MH	A-7	0	100	99-100	80-100	60-95	50-65	25-40
Maben part-------	0-4	Fine sandy loam	SM, SM-SC	A-6	0	95-100	90-100	70-85	36-50	<30	NP-7
	4-35	Clay, silty clay, clay loam.	MH, CH	A-7	0	95-100	90-100	90-100	75-95	50-80	18-40
	35-72	Stratified weathered bedrock to loam.	CL, CH	A-4, A-6, A-7	0	95-100	80-95	70-90	60-75	30-62	10-21

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[Dashes indicate data were not available. The symbol < means less than; > means greater than. The erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in of soil	pH					
Ariel:									
Ae	0-32	0.6-2.0	0.20-0.22	4.5-5.5	Low	Low	Moderate	---	---
	32-60	0.2-0.6	0.16-0.20	4.5-5.5	Low	Low	Moderate	---	
Arkabutla:									
Ar, Au	0-7	0.6-2.0	0.20-0.22	4.5-6.5	Low	High	High	---	---
	7-48	0.6-2.0	0.18-0.21	4.5-5.5	Low	High	High	---	
Bonn:									
Bo	0-13	0.2-0.6	0.15-0.23	4.5-7.3	Low	High	Low	0.49	3
	13-49	<0.06	0.08-0.14	5.6-9.0	Low	High	Low	0.49	
	49-80	<0.2	0.08-0.14	6.6-9.0	Low	High	Low	0.49	
Bruno:									
Br, Bu	0-9	6.0-20	0.10-0.15	5.1-7.8	Low	Low	Low	---	---
	9-41	6.0-20	0.05-0.10	5.1-7.8	Low	Low	Low	---	
	41-60	6.0-20	0.02-0.05	5.1-7.8	Very low	Low	Low	---	
Calloway:									
CaA	0-23	0.6-2.0	0.20-0.23	4.5-6.0	Low	High	Moderate	0.49	3
	23-53	0.06-0.2	0.09-0.12	4.5-6.0	Moderate	High	Moderate	0.43	
	53-70	0.06-0.2	0.09-0.12	5.1-7.3	Low	High	Moderate	0.43	
Cascilla:									
Cc, Cd	0-59	0.6-2.0	0.18-0.22	4.5-5.5	Low	Low	Moderate	---	---
	59-72	0.6-2.0	0.16-0.20	4.5-5.5	Low	Low	Moderate	---	
Collins:									
Cn, Co	0-55	0.6-2.0	0.20-0.24	4.5-5.5	Low	Moderate	Moderate	---	---
Deerford:									
De	0-8	0.6-2.0	0.21-0.23	4.5-6.0	Low	High	Moderate	0.49	3
	8-43	0.06-0.2	0.12-0.18	5.1-8.4	Moderate	High	Low	0.43	
	43-60	0.2-0.6	0.12-0.15	6.6-8.4	Low	High	Low	0.49	
Gillsburg:									
Ga, Gb	0-35	0.6-2.0	0.20-0.22	4.5-5.5	Low	High	High	---	---
	35-60	0.2-0.6	0.16-0.18	4.5-5.5	Low	High	High		
Grenada:									
GrA, GrB	0-7	0.6-2.0	0.20-0.23	4.5-6.0	Low	Moderate	Moderate	0.43	3
	7-26	0.6-2.0	0.20-0.23	4.5-6.0	Low	Moderate	Moderate	0.43	
	26-30	0.6-2.0	0.20-0.23	4.5-6.0	Low	Moderate	Moderate	0.47	
	30-52	0.06-0.2	0.10-0.12	4.5-6.0	Low	Moderate	Moderate	0.47	
Loring:									
LoB2, LoC2, LoC3, LoD2, LoD3, [1]LrE	0-3	0.6-2.0	0.20-0.23	4.5-6.0	Low	Moderate	Moderate	0.37	3
	3-31	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	
	31-65	0.2-0.6	0.06-0.13	4.5-6.0	Low	Moderate	Moderate	0.32	
Maben:									
[1]MAE:									
Maben part	0-4	0.6-2.0	0.12-0.16	5.1-6.5	Low	High	Moderate	0.37	3
	4-35	0.2-0.6	0.14-0.18	4.5-6.0	Moderate	High	Moderate	0.28	
	35-72	0.2-0.6	0.14-0.18	4.5-6.0	Moderate	High	Moderate	0.28	
Smithdale part	0-14	2.0-6.0	0.05-0.10	4.5-6.0	Low	Low	Moderate	0.17	5
	14-45	0.6-2.0	0.15-0.17	4.5-5.5	Low	Low	Moderate	0.24	
	45-70	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.24	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in of soil	pH					
Memphis:									
MeB2, MeC2, MeD3, MeE2	0-4	0.6-2.0	0.20-0.23	4.5-6.0	Low	Low	Moderate	0.37	5
	4-38	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	
	38-60	0.6-2.0	0.20-0.23	4.5-6.0	Low	Low	Moderate	0.37	
Oaklimeter:									
Oa, Ok	0-6	0.6-2.0	0.20-0.22	4.5-5.5	Low	Moderate	High	---	---
	6-27	0.6-2.0	0.15-0.20	4.5-5.5	Low	Moderate	High	---	
	27-70	0.6-2.0	0.20-0.22	4.5-5.5	Low	Moderate	High	---	
Providence:									
PrB2, PrC2, PrE2, PrE3	0-2	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	3
	2-19	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	
	19-36	0.2-0.6	0.08-0.10	4.5-6.0	Moderate	Moderate	Moderate	0.37	
	36-54	0.2-0.6	0.08-0.10	4.5-6.0	Low	Moderate	Moderate	0.32	
	54-80	0.6-2.0	0.10-0.15	4.5-6.0	Low	Moderate	Moderate	0.32	
[1]PvD3:									
Providence part	0-2	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	3
	2-19	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	
	19-36	0.2-0.6	0.08-0.10	4.5-6.0	Moderate	Moderate	Moderate	0.37	
	36-54	0.2-0.6	0.08-0.10	4.5-6.0	Low	Moderate	Moderate	0.32	
	54-80	0.6-2.0	0.10-0.15	4.5-6.0	Low	Moderate	Moderate	0.32	
Smithdale part	0-14	2.0-6.0	0.05-0.10	4.5-5.5	Low	Low	Moderate	0.17	5
	14-45	0.6-2.0	0.15-0.17	4.5-5.5	Low	Low	Moderate	0.24	
	45-70	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.24	
Smithdale:									
[1]SdE2, [1]SmE, [1]STF:									
Smithdale part	0-14	2.0-6.0	0.05-0.10	4.5-5.5	Low	Low	Moderate	0.17	5
	14-45	0.6-2.0	0.15-0.17	4.5-5.5	Low	Low	Moderate	0.24	
	45-70	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.24	
Providence part	0-2	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	3
	2-19	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	
	19-36	0.2-0.6	0.08-0.10	4.5-6.0	Moderate	Moderate	Moderate	0.37	
	36-54	0.2-0.6	0.08-0.10	4.5-6.0	Low	Moderate	Moderate	0.32	
	54-80	0.6-2.0	0.10-0.15	4.5-6.0	Low	Moderate	Moderate	0.32	
Tippah:									
TaC2	0-6	0.6-2.0	0.20-0.22	4.5-6.0	Low	High	High	0.43	4
	6-30	0.06-0.2	0.19-0.21	4.5-6.0	Moderate	High	High	0.43	
	30-72	0.06-0.2	0.16-0.18	4.5-6.0	High	High	High	0.24	
[1]TpD2:									
Tippah part	0-6	0.6-2.0	0.20-0.22	4.5-6.0	Low	High	High	0.43	4
	6-30	0.06-0.2	0.19-0.21	4.5-6.0	Moderate	High	High	0.43	
	30-72	0.06-0.2	0.16-0.18	4.5-6.0	High	High	High	0.24	
Maben part	0-4	0.6-2.0	0.12-0.16	5.1-6.5	Low	High	Moderate	0.37	3
	4-35	0.2-0.6	0.14-0.18	4.5-6.0	High	High	Moderate	0.28	
	35-72	0.2-0,6	0.14-0.18	4.5-6.0	Moderate	High	Moderate	0.28	

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 15.--SOIL AND WATER FEATURES

[Absence of an entry indicates the feature is not a concern. See text for descriptions of symbols and such terms as "rare," "brief," and "perched." The symbol < means less than; > means greater than]

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
Ariel:							
Ae	C	Common	Brief	Jan-Apr	2.0-3.0	Apparent	Jan-Apr
Arkabutla:							
Ar, Au	C	Common	Brief to very long	Jan-Apr	1.5-2.5	Apparent	Jan-Apr
Bonn:							
Bo	D	None	---	---	0-2.0	Perched	Dec-Apr
Bruno:							
Br, Bu	A	Common	Brief to very long	Dec-Jun	4.0-6.0	Apparent	Dec-Apr
Calloway:							
CaA	C	None	---	---	1.0-2.0	Perched	Jan-Apr
Cascilla:							
Cc, Cd	B	Common	Brief to very long	Jan-Apr	>6.0	---	---
Collins:							
Cn, Co	C	Common	Brief to very long	Jan-Apr	2.0-5.0	Apparent	Jan-Apr
Deerford:							
De	D	None	---	---	0.5-1.5	Perched	Dec-Apr
Gillsburg:							
Ga, Gb	C	Common	Brief to very long	Jan-Apr	1.0-1.5	Apparent	Jan-Apr
Grenada:							
GrA, GrB	C	None	---	---	2.0-2.5	Perched	Jan-Mar
Loring:							
LoB2, LoC2, LoC3, LoD2, LoD3, [1]LrE	C	None	---	---	2.0-3.0	Perched	Jan-Mar
Maben:							
[1]MAE:							
Maben part	C	None	---	---	>6.0	---	---
Smithdale part	B	None	---	---	>6.0	---	---
Memphis:							
MeB2, MeC2, MeD3, MeE2	B	None	---	---	>6.0	---	---
Oaklimeter:							
Oa, Ok	C	Common	Brief to very long	Jan-Apr	1.5-2.5	Apparent	Jan-Mar

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
Providence: PrB2, PrC2, PrE2, PrE3	C	None	---	---	1.5-3.0	Perched	Jan-Mar
[1]PvD3: Providence part	C	None	---	---	1.5-3.0	Perched	Jan-Mar
Smithdale part	B	None	---	---	>6.0	---	---
Smithdale: [1]SdE2, [1]SmE, [1]STF: Smithdale part	B	None	---	---	>6.0	---	---
Providence part	C	None	---	---	1.5-3.0	Perched	Jan-Mar
Tippah: TaC2	C	None	---	---	1.5-2.5	Perched	Dec-Apr
[1]TpD2: Tippah part	C	None	---	---	1.5-2.5	Perched	Dec-Apr
Maben part	C	None	---	---	>6.0	---	---

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 16.--CHEMICAL ANALYSIS OF SELECTED SOILS

[Analyzed by the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station]

Soil series	Horizons	Depth from surface	Reaction 1:1 water	Extractable cations				Extractible acidity	Sum of cations	Base saturation by sum of cation
				Ca	Mg	K	Na			
		In		------milliequivalents per 100-grams-------						Pct
Bruno	Ap	0-9	5.8	1.1	0.4	0.1	0.0	1.7	3.3	47.8
	C1	9-12	5.6	0.2	0.4	0.0	0.0	0.7	1.1	25.9
	C2	12-15	5.7	0.5	0.2	0.8	0.0	2.6	4.1	36.0
	C3	15-19	5.3	0.2	0.0	0.0	0.0	0.2	0.4	54.1
	C4	19-21	5.1	1.1	0.3	0.1	0.0	2.4	3.9	39.2
	C5	21-29	5.7	0.2	0.1	0.0	0.0	0.1	0.4	75.1
	C6	29-37	5.3	0.5	0.1	0.0	0.0	0.8	1.4	44.2
	C7	37-41	4.7	1.1	0.4	0.0	0.0	2.8	4.3	35.9
	C8	41-60	4.5	0.2	0.0	0.0	0.0	0.7	0.9	29.1
Oaklimeter	Ap	0-6	4.7	2.9	1.2	0.1	0.2	5.6	10.0	44.3
	B21	6-18	4.8	2.1	1.1	0.1	0.2	4.2	7.7	45.5
	B22	18-27	5.0	1.2	0.6	0.0	0.1	4.0	5.9	32.8
	A2b&B2b	27-52	5.0	0.9	1.1	0.1	0.2	5.1	7.4	30.3
	Bgb	52-70	5.0	0.1	0.6	0.0	0.1	3.7	4.5	19.5
Smithdale	A1	0-4	6.1	1.7	0.4	0.1	0.0	3.3	5.5	41.2
	A2	4-14	6.0	0.1	0.1	0.0	0.1	3.7	4.0	7.6
	B21t	14-32	5.2	0.1	0.8	0.1	0.0	7.6	8.6	13.1
	B22t	32-45	5.4	0.0	0.4	0.1	0.0	5.1	5.6	8.8
	B23t	45-70	5.4	0.0	0.5	0.1	0.0	4.6	5.2	12.5

TABLE 17.--PARTICLE SIZE DISTRIBUTION IN SELECTED SOILS

[Analyzed by Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station]

Soil series	Horizon	Depth from surface	Particle-size distribution		
			Total clay 0.002 mm	Total silt 0.05 to 0.002 mm	Total sand 2.0 to 0.05 mm
		In			
Ariel	Ap	0-7	10.1	82.9	7.0
	B21	7-16	14.5	81.9	3.6
	B22	16-27	15.2	81.7	3.1
	B23	27-32	16.5	80.7	2.8
	A2b	32-40	6.8	86.4	6.8
	B2b	40-60	13.4	78.8	7.8
Arkabutla	Ap	0-7	18.1	74.6	7.3
	B21	7-17	18.3	74.8	6.9
	B22g	17-27	32.8	56.6	10.6
	B23g	27-48	25.8	54.5	19.7
Bruno	Ap	0-9	6.3	24.4	69.3
	C1	9-12	3.8	2.7	93.5
	C2	12-15	6.3	37.0	56.7
	C3	15-19	1.3	6.7	92.0
	C4	19-21	6.4	53.8	39.8
	C5	21-29	0.7	5.3	94.0
	C6	29-37	1.3	15.5	83.2
	C7	37-41	7.9	78.7	13.4
	C8	41-60	0.8	4.4	94.8
Cascilla	Ap	0-7	15.2	79.4	5.4
	B21	7-25	22.3	73.4	4.3
	B22	25-31	17.3	72.9	9.3
	B23	31-39	19.4	61.1	19.5
	B24	39-59	15.5	53.3	31.2
Gillsburg	Ap	0-5	7.9	82.8	9.3
	B21	5-13	18.2	71.6	10.2
	B22	13-19	12.6	70.2	17.2
	B23g	19-35	15.4	67.6	17.0
	A2gb	35-44	15.2	64.9	19.9
	Bgb	44-60	7.5	44.6	47.9
Oaklimeter	Ap	0-6	13.2	83.7	3.1
	B21	6-18	12.0	85.7	2.3
	B22	18-27	10.1	84.2	5.7
	A2b&B2b	27-52	12.2	84.4	3.4
	Bgb	52-70	9.6	75.5	14.9
Smithdale	A1	0-4	4.5	21.6	73.9
	A2	4-14	4.5	20.5	75.0
	B21t	14-32	30.3	7.7	62.0
	B22t	32-45	24.4	3.6	72.0
	B23t	45-70	18.7	4.7	76.6

TABLE 18.--ENGINEERING TEST DATA

[Tests performed by Mississippi State Highway Department, in cooperation with the Bureau of Public Roads, U.S. Department of Commerce, in accordance with standard procedures of the American Association of State Highway and Transportation Officials (AASHTO)[1]]

Soil name and location	Parent material	Mississippi State Highway Laboratory No.	Depth from surface	Moisture-density data[1]: Maximum dry density	Moisture-density data[1]: Optimum moisture	Mechanical analysis[2], Percentage passing sieve--: No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	Mechanical analysis[2], Percentage smaller than--: 0.05 mm	0.02 mm	0.005 mm	0.002 mm	Liquid limit	Plasticity index	Classification: AASHTO	Classification: Unified
			In	lb/ft3	Pct								Pct			
Maben sandy loam, 4 miles north of State Highway No. 330, 1 mile west of Calhoun County line. SW1/4SW1/4 sec. 36, T. 25 N., R. 7 E.	Stratified layers of shaly clay and sandy material	20	7-18	98.0	21.8	100	100	86	73	63	55	47	61	17	A-7	CH
		21	35-72	96.4	22.8	100	99	87	72	58	45	35	62	21	A-7	CH
Smithdale loamy sand, 7 1/2 miles northeast of Coffeeville, 1/4 mile north of fork of road, 150 feet east in woods. NE1/4NE1/4 sec. 28, T. 25 N., R. 7 E.	Loamy materials	18	14-32	104.2	19.2	100	100	45	35	34	33	31	41	27	A-7	CL-ML
		19	45-70	109.4	15.4	100	100	34	18	16	16	15	---	NP	A-2	SM

[1]Based on AASHTO Designation: T 99-57, Method A (1).

[2]Mechanical analysis according to AASHTO Designation T 88-57 (1). Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

TABLE 19.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Ariel	Coarse-silty, mixed, thermic Fluventic Dystrochrepts
Arkabutla	Fine-silty, mixed, acid, thermic Aeric Fluvaquents
Bonn	Fine-silty, mixed, thermic Glossic Natraqualfs
Bruno	Sandy, mixed, thermic Typic Udifluvents
Calloway	Fine-silty, mixed, thermic Glossaquic Fragiudalfs
Cascilla	Fine-silty, mixed, thermic Fluventic Dystrochrepts
Collins	Coarse-silty, mixed, acid, thermic Aquic Udifluvents
Deerford	Fine-silty, mixed, thermic Albic Glossic Natraqualfs
Gillsburg	Coarse-silty, mixed, acid, thermic Aeric Fluvaquents
Grenada	Fine-silty, mixed, thermic Glossic Fragiudalfs
Loring	Fine-silty, mixed, thermic Typic Fragiudalfs
Maben	Fine, mixed, thermic Ultic Hapludalfs
Memphis	Fine-silty, mixed, thermic Typic Hapludalfs
Oaklimeter	Coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts
Providence	Fine-silty, mixed, thermic Typic Fragiudalfs
Smithdale	Fine-loamy, siliceous, thermic Typic Paleudults
Tippah	Fine-silty, mixed, thermic Aquic Paleudalfs

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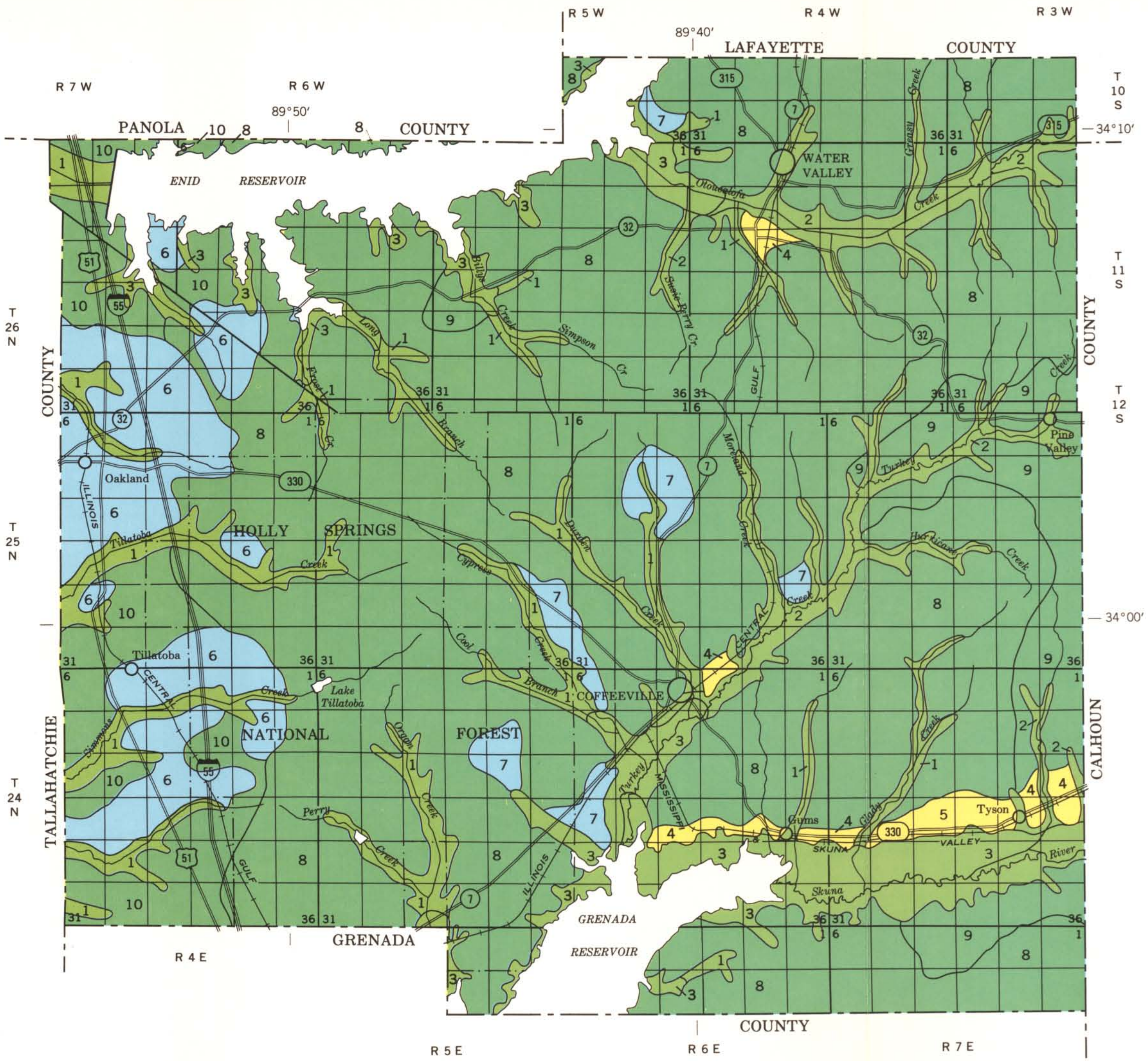


SOIL ASSOCIATIONS

AREAS DOMINATED BY NEARLY LEVEL SOILS THAT ARE SUBJECT TO FLOODING

1 COLLINS–OAKLIMETER association: Moderately well drained, nearly level silty soils; on flood plains

2 OAKLIMETER–GILLSBURG association: Moderately well drained and somewhat poorly drained, nearly level silty soils; on flood plains

3 ARKABUTLA–COLLINS–OAKLIMETER association: Somewhat poorly drained and moderately well drained, nearly level silty soils; on flood plains subject to flooding from reservoir backwaters

AREAS DOMINATED BY NEARLY LEVEL AND GENTLY SLOPING SOILS ON UPLANDS

4 GRENADA–CALLOWAY association: Moderately well drained and somewhat poorly drained, nearly level to gently sloping silty soils that have a fragipan; on uplands

5 BONN–GILLSBURG–DEERFORD association: Poorly drained and somewhat poorly drained, silty soils that are high in sodium and are on uplands, and somewhat poorly drained silty soils on flood plains

AREAS DOMINATED BY SLOPING AND STRONGLY SLOPING SOILS ON UPLANDS

6 LORING–MEMPHIS association: Moderately well drained silty soils that have a fragipan, and well drained silty soils; on uplands

7 PROVIDENCE–LORING association: Moderately well drained silty soils that have a fragipan; on broad ridgetops and strong side slopes

AREAS DOMINATED BY HILLY SOILS ON UPLANDS

8 SMITHDALE–PROVIDENCE association: Well drained, steep loamy soils on side slopes, and moderately well drained silty soils that have a fragipan, and are on narrow ridgetops

9 MABEN–SMITHDALE–TIPPAH association: Well drained and moderately well drained, clayey, loamy, and silty soils; on side slopes

10 MEMPHIS–LORING–PROVIDENCE association: Well drained silty soils on side slopes, and moderately well drained silty soils that have a fragipan; on ridgetops and upper side slopes

Compiled 1977

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

N

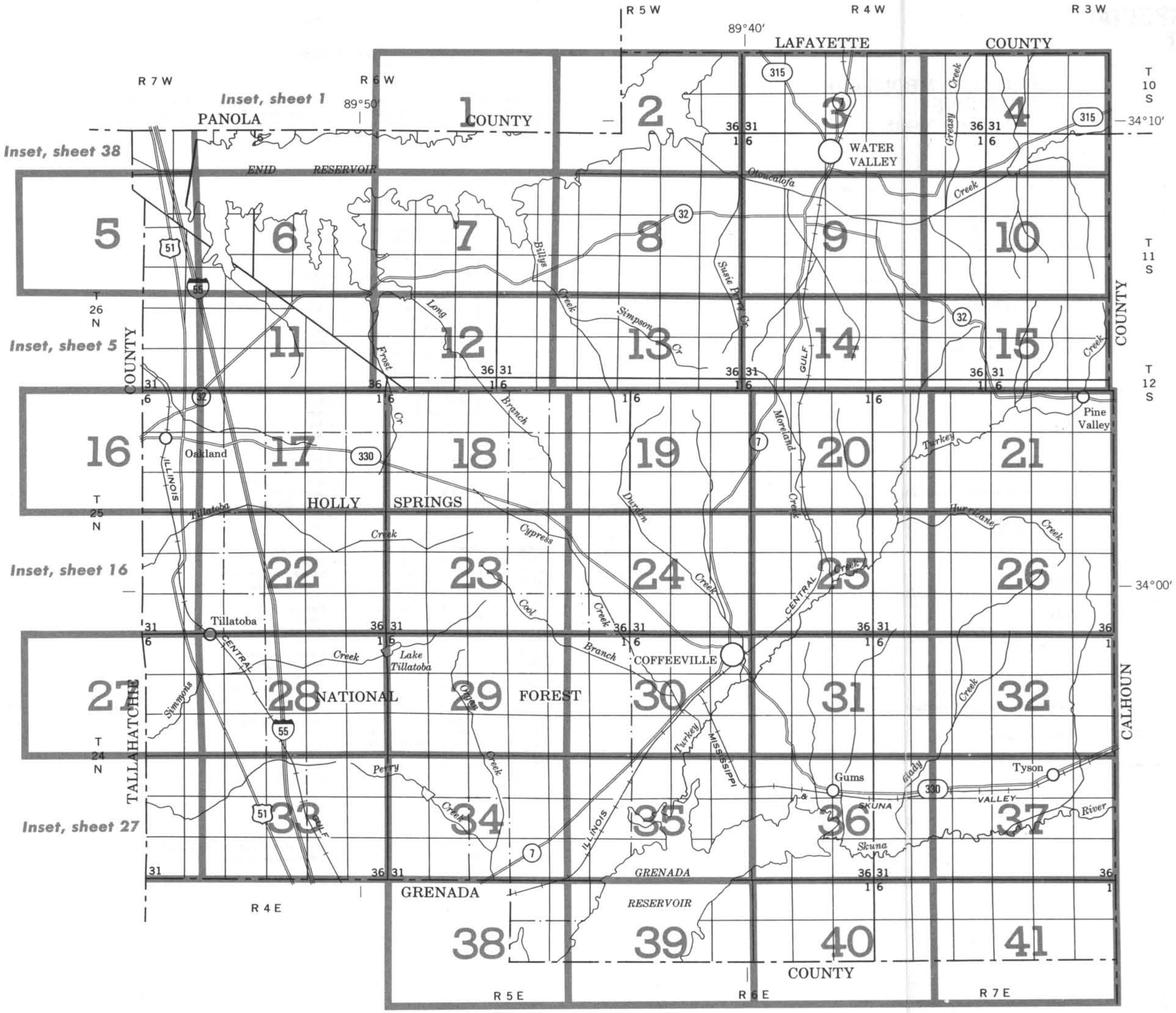
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE
MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

GENERAL SOIL MAP

YALOBUSHA COUNTY, MISSISSIPPI

1 0 1 2 3 4 Miles



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

N

INDEX TO MAP SHEETS

YALOBUSHA COUNTY, MISSISSIPPI

1 0 1 2 3 4 Miles

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Davis Airstrip; FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52
- County, farm or ranch — 378

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water; w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — Int; i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CeA; FoB2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) — S

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

SOIL LEGEND

The first letter, always a capital, is the initial letter of the soil name. The second letter is a capital if the mapping unit is broadly defined 1/; otherwise, it is a small letter. The third letter, always a capital, shows the slope. Symbols without slope letters are those of nearly level soils. A final number, 2 or 3, in the symbol shows the soil is eroded or severely eroded.

SYMBOL	NAME
Ae	Ariel silt loam, occasionally flooded
Ar	Arkabutla silt loam, occasionally flooded
Au	Arkabutla silt loam, frequently flooded
Bo	Bonn silt loam
Br	Bruno sandy loam, occasionally flooded
Bu	Bruno sandy loam, frequently flooded
CaA	Calloway silt loam, 0 to 2 percent slopes
Cc	Cascilla silt loam, occasionally flooded
Cd	Cascilla silt loam, frequently flooded
Cn	Collins silt loam, occasionally flooded
Co	Collins silt loam, frequently flooded
De	Deerford complex
Ga	Gillsburg silt loam, occasionally flooded
Gb	Gillsburg silt loam, frequently flooded
GrA	Grenada silt loam, 0 to 2 percent slopes
GrB	Grenada silt loam, 2 to 5 percent slopes
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded
LrE	Loring-Udorthents complex, gullied
MAE	Maben-Smithdale association, hilly
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded
MeD3	Memphis silt loam, 8 to 12 percent slopes, severely eroded
MeE2	Memphis silt loam, 12 to 20 percent slopes, eroded
Oa	Oaklimeter silt loam, occasionally flooded
Ok	Oaklimeter silt loam, frequently flooded
PG	Pits
PrB2	Providence silt loam, 2 to 5 percent slopes, eroded
PrC2	Providence silt loam, 5 to 8 percent slopes, eroded
PrE2	Providence silt loam, 8 to 15 percent slopes, eroded
PrE3	Providence silt loam, 8 to 15 percent slopes, severely eroded
PvD3	Providence-Smithdale complex, 8 to 12 percent slopes, severely eroded
SdE2	Smithdale-Providence complex, 12 to 25 percent slopes, eroded
SmE	Smithdale-Udorthents complex, gullied
STF	Smithdale-Providence association, hilly
TaC2	Tippah silt loam, 5 to 8 percent slopes, eroded
TpD2	Tippah-Maben complex, 8 to 12 percent slopes, eroded
W	Water

1/ The composition of these units is more variable than that of others in the survey area, but has been controlled well enough to be interpreted for the expected use of the soils.

YALOBUSHA COUNTY, MISSISSIPPI NO. 1

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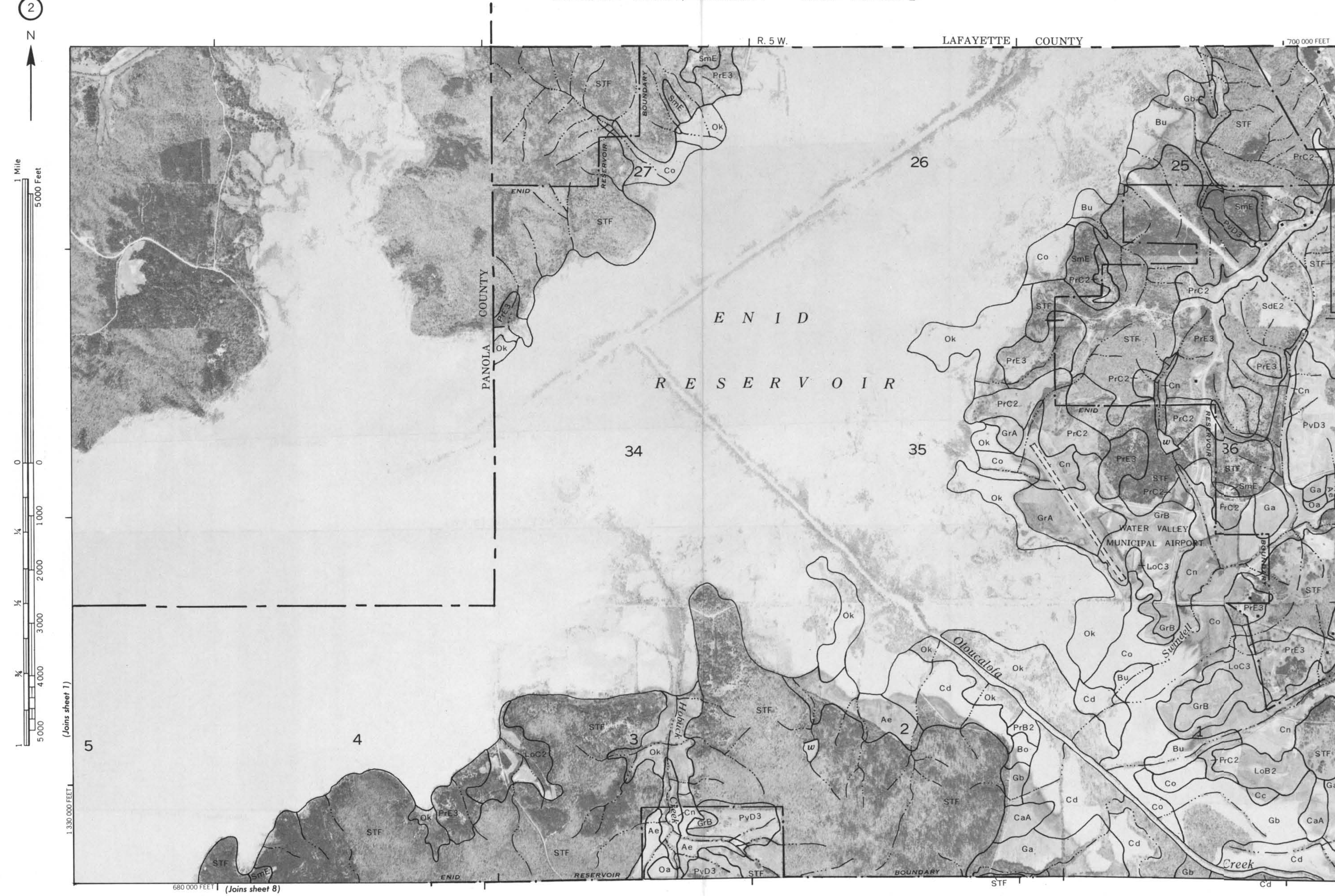

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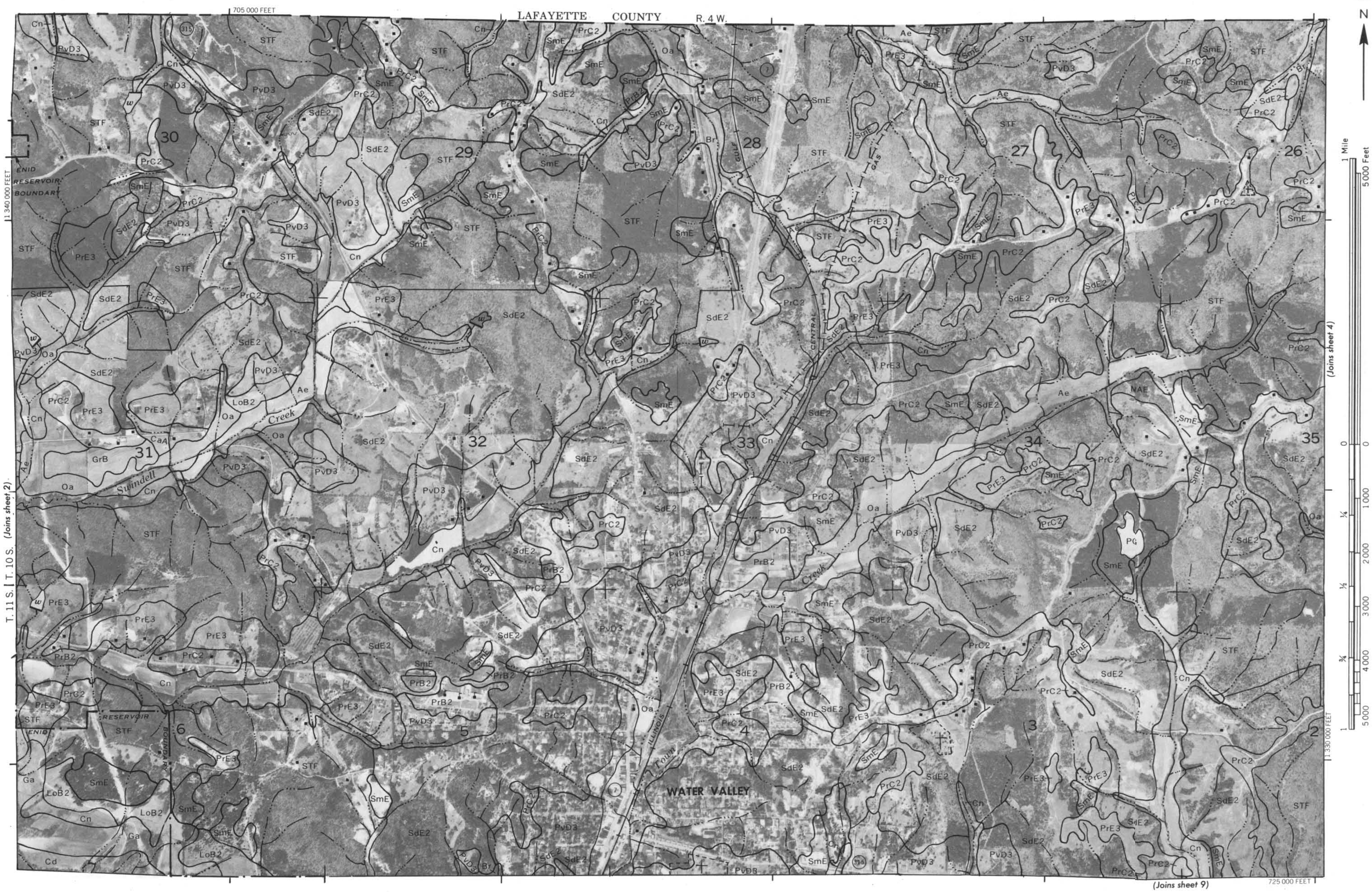

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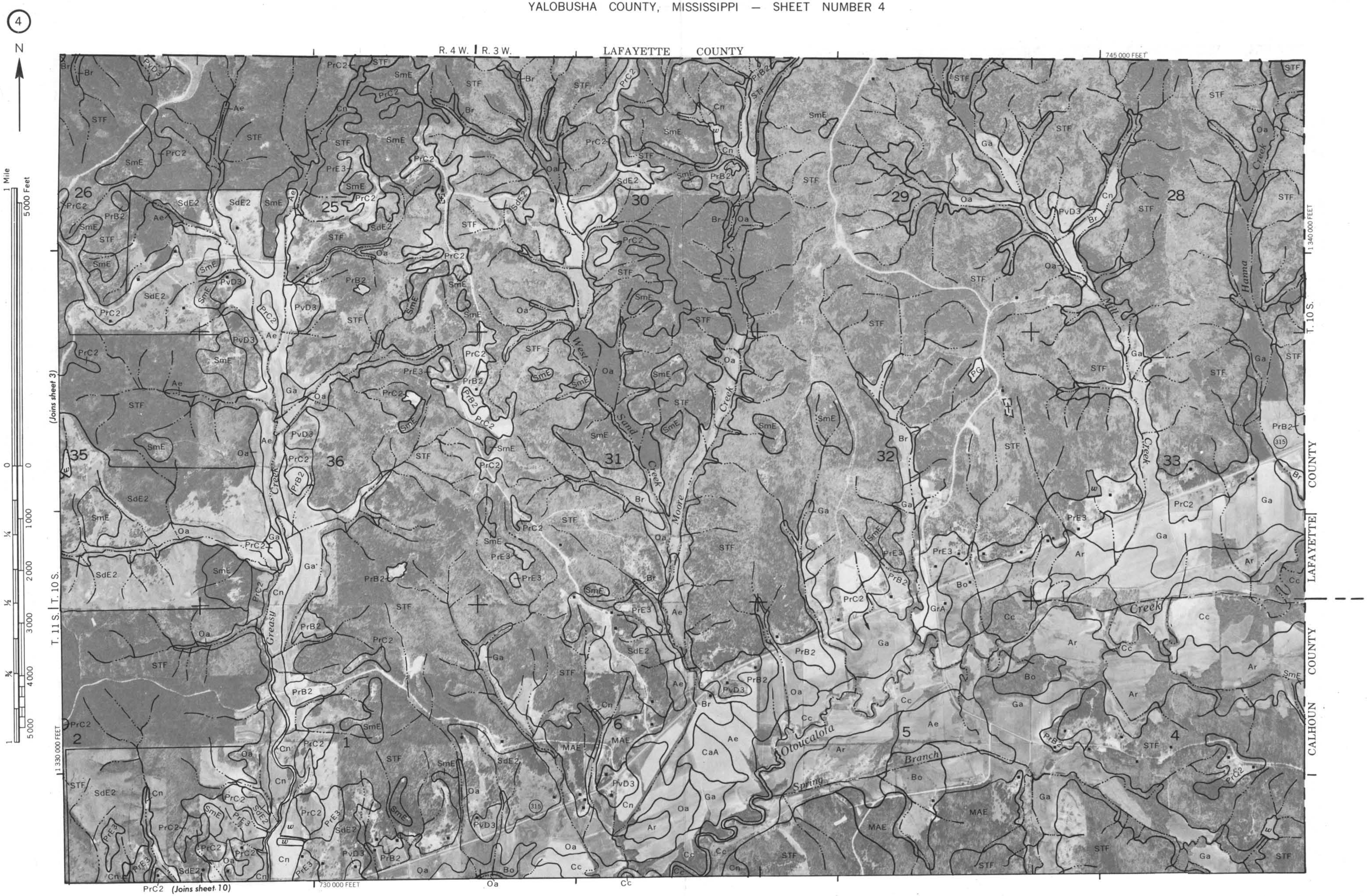

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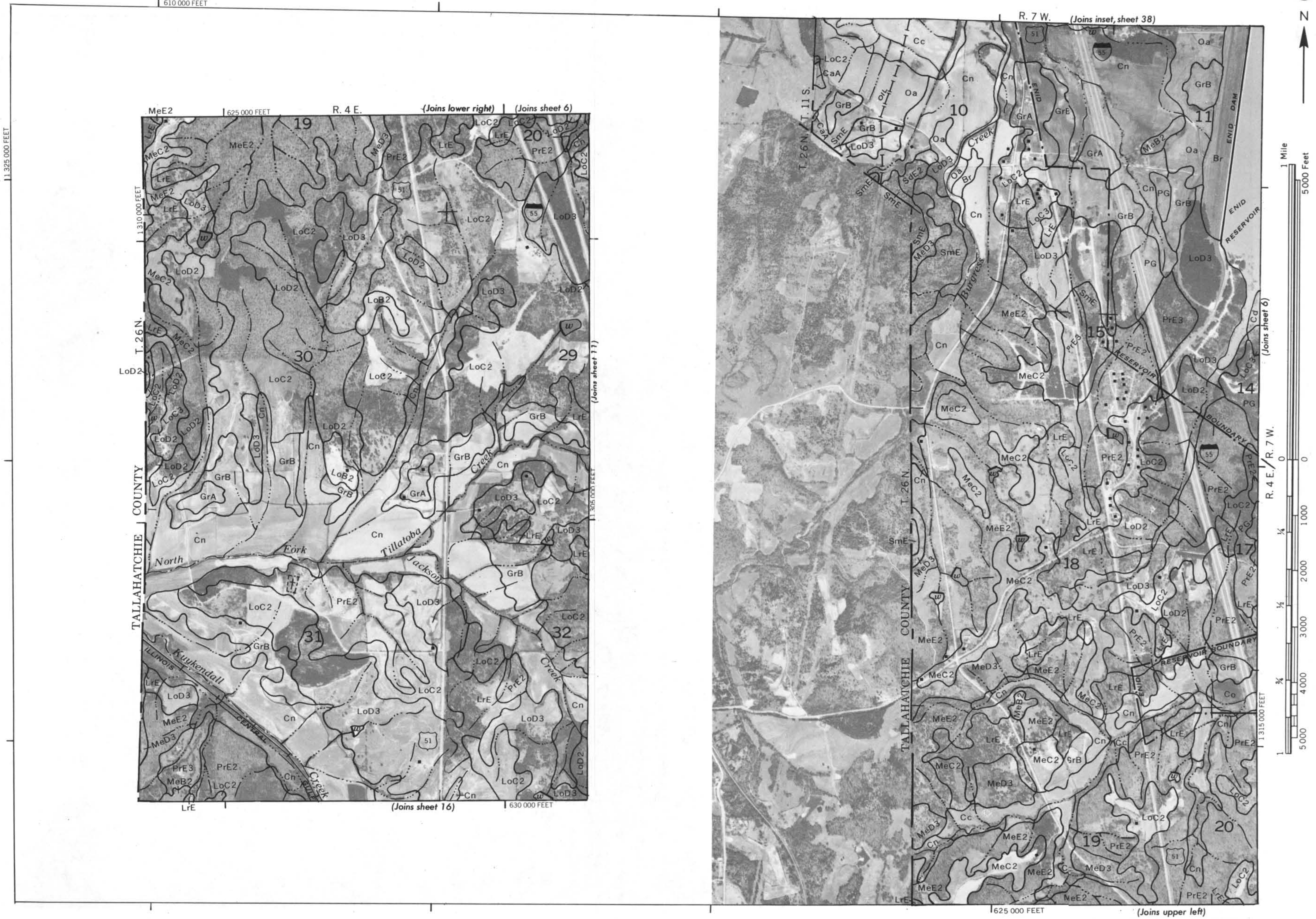

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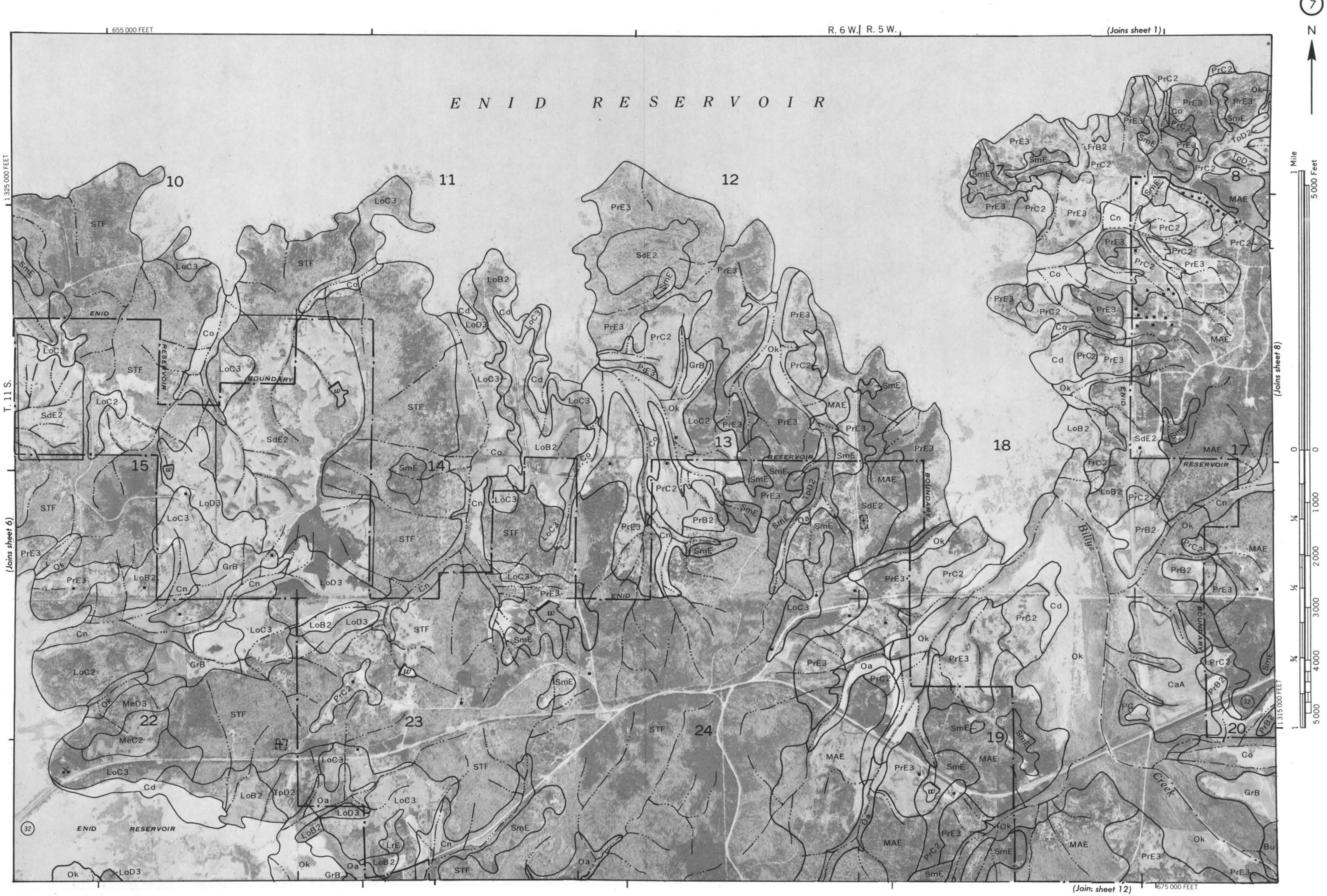

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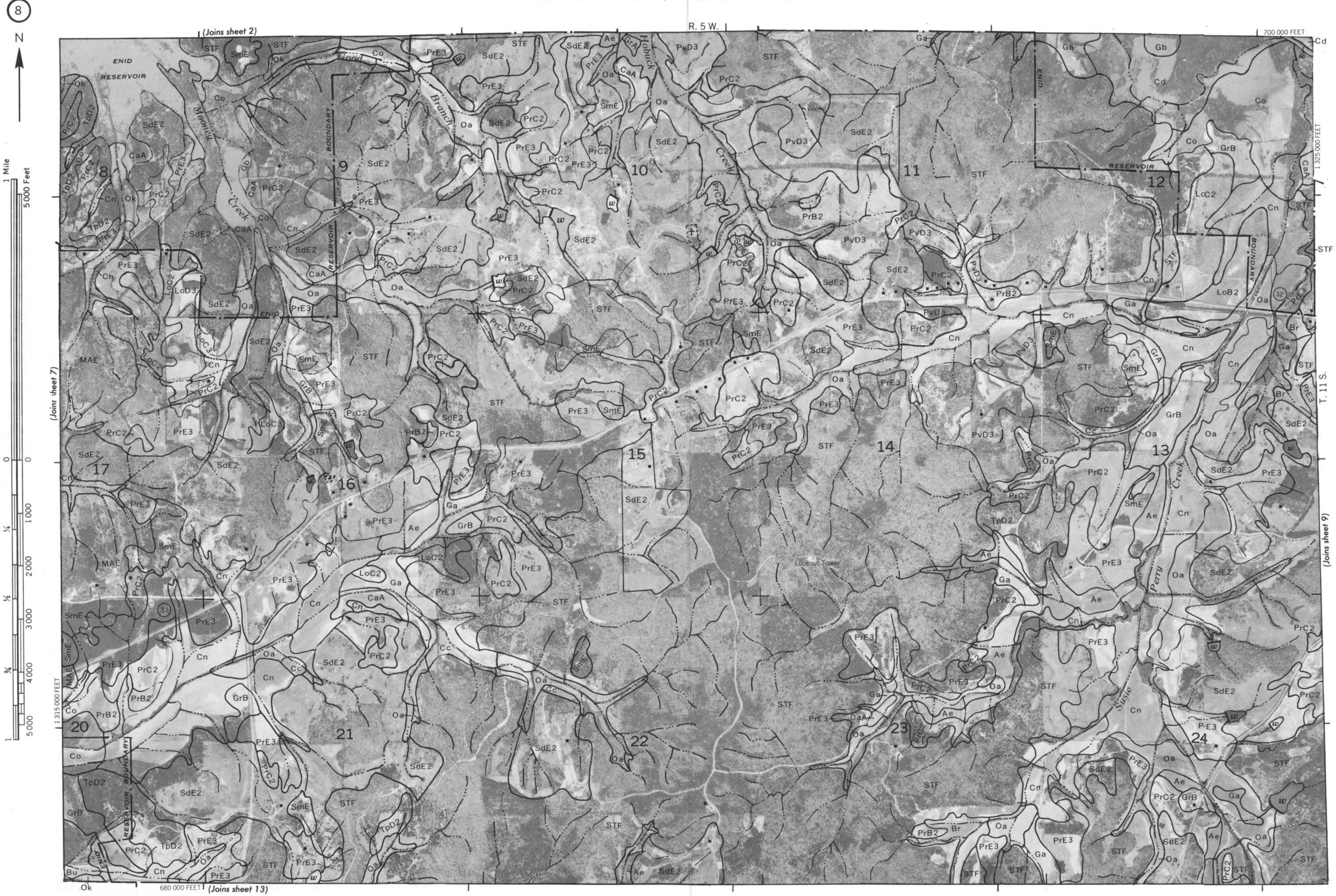

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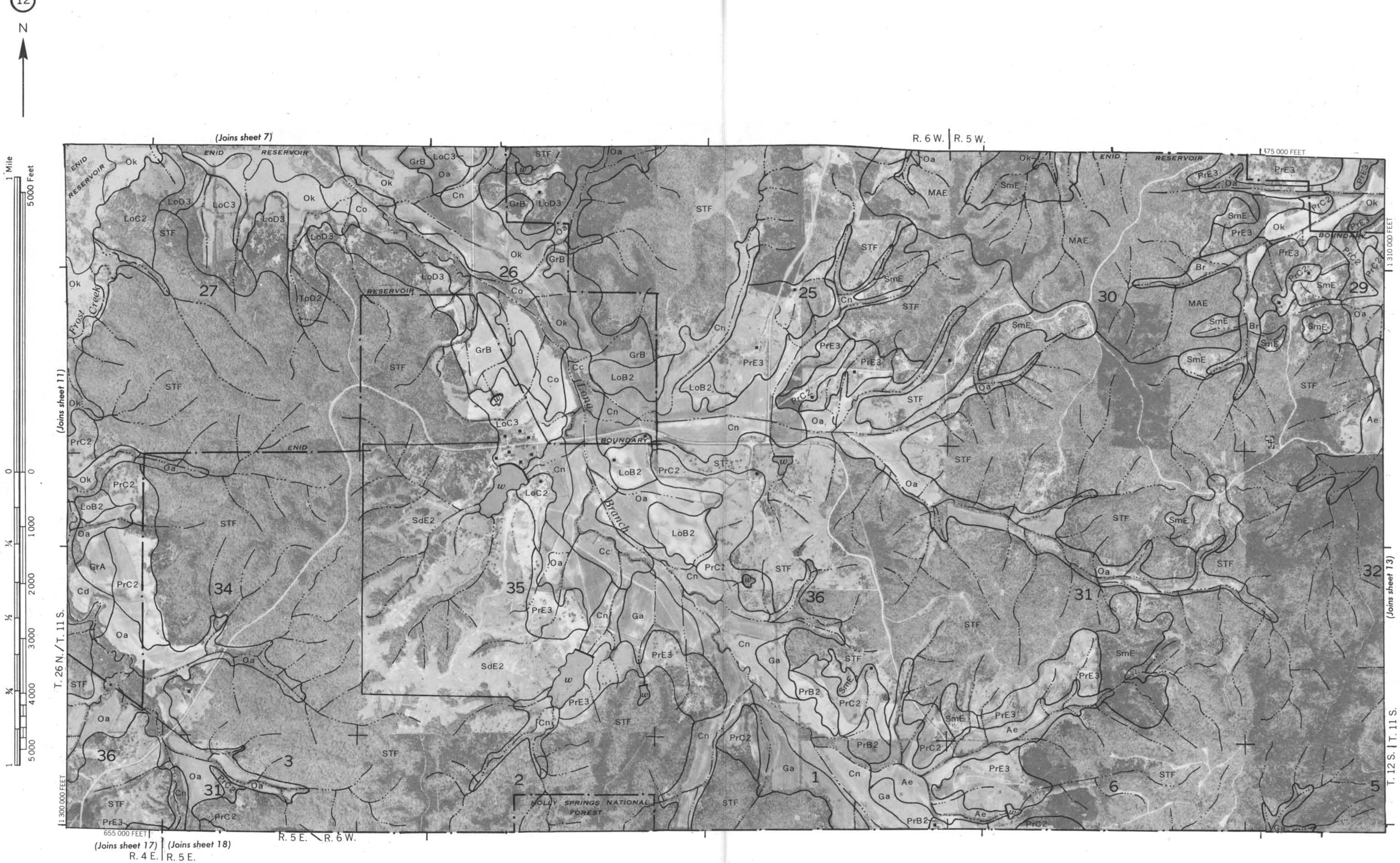
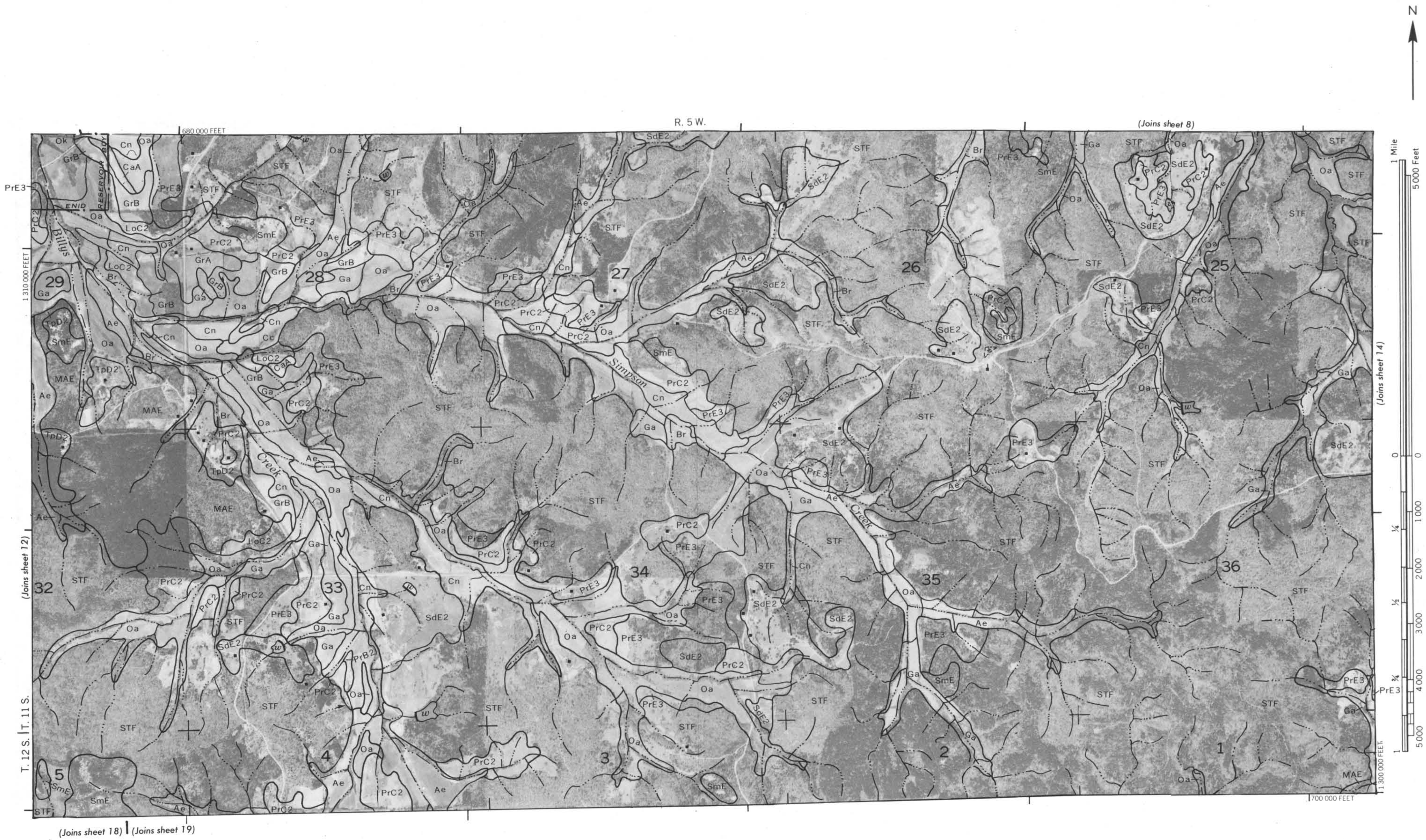


This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



YALOBUSHA COUNTY, MISSISSIPPI NO. 13

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

YALOBUSHA COUNTY, MISSISSIPPI — SHEET NUMBER 14

N

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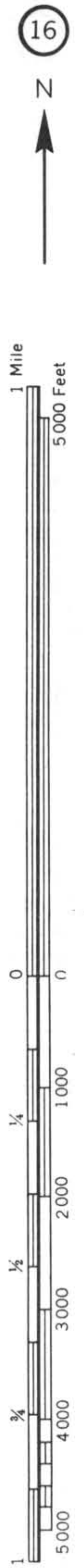
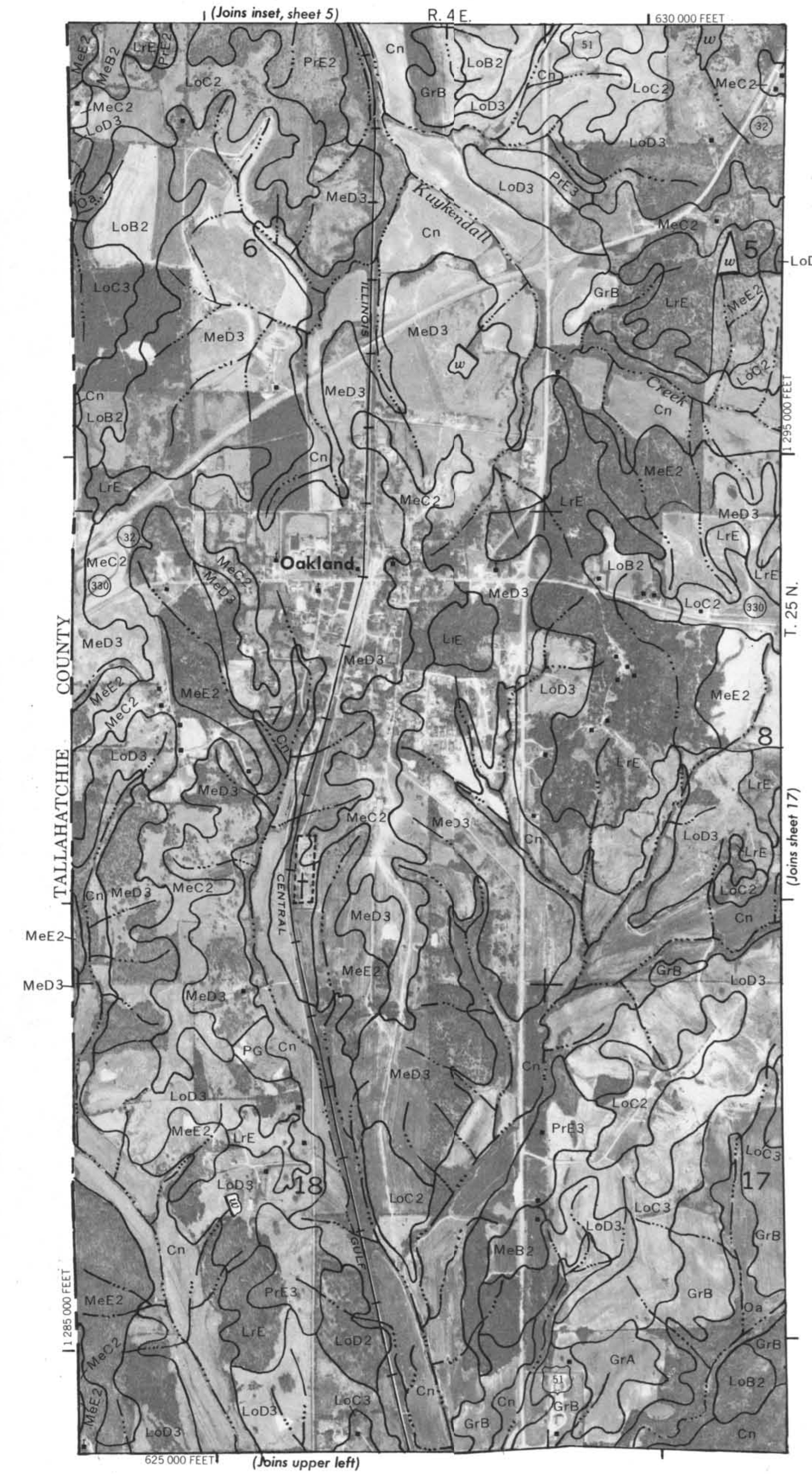
YALOBUSHA COUNTY, MISSISSIPPI NO. 14

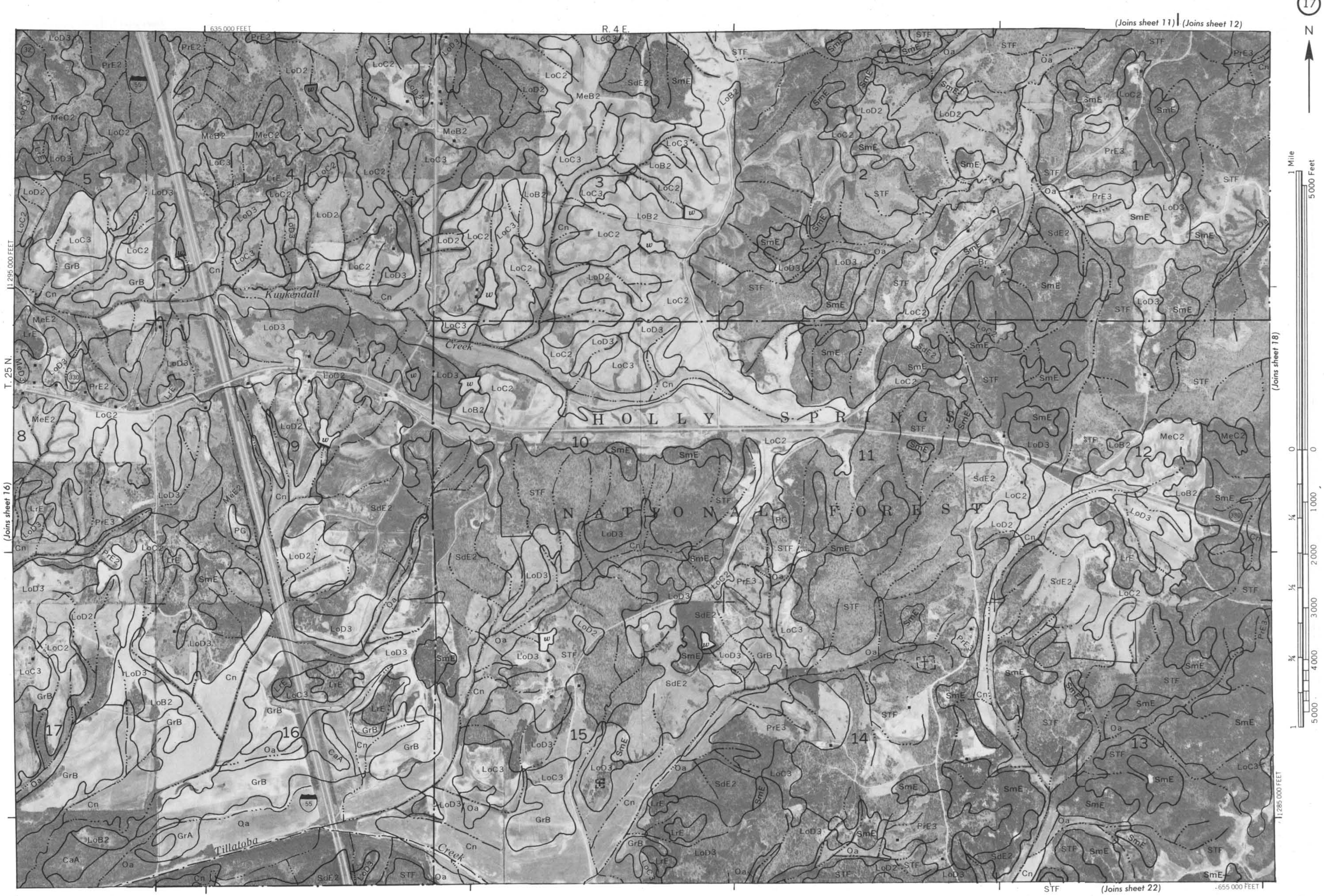
YALOBUSHA COUNTY, MISSISSIPPI NO. 15

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



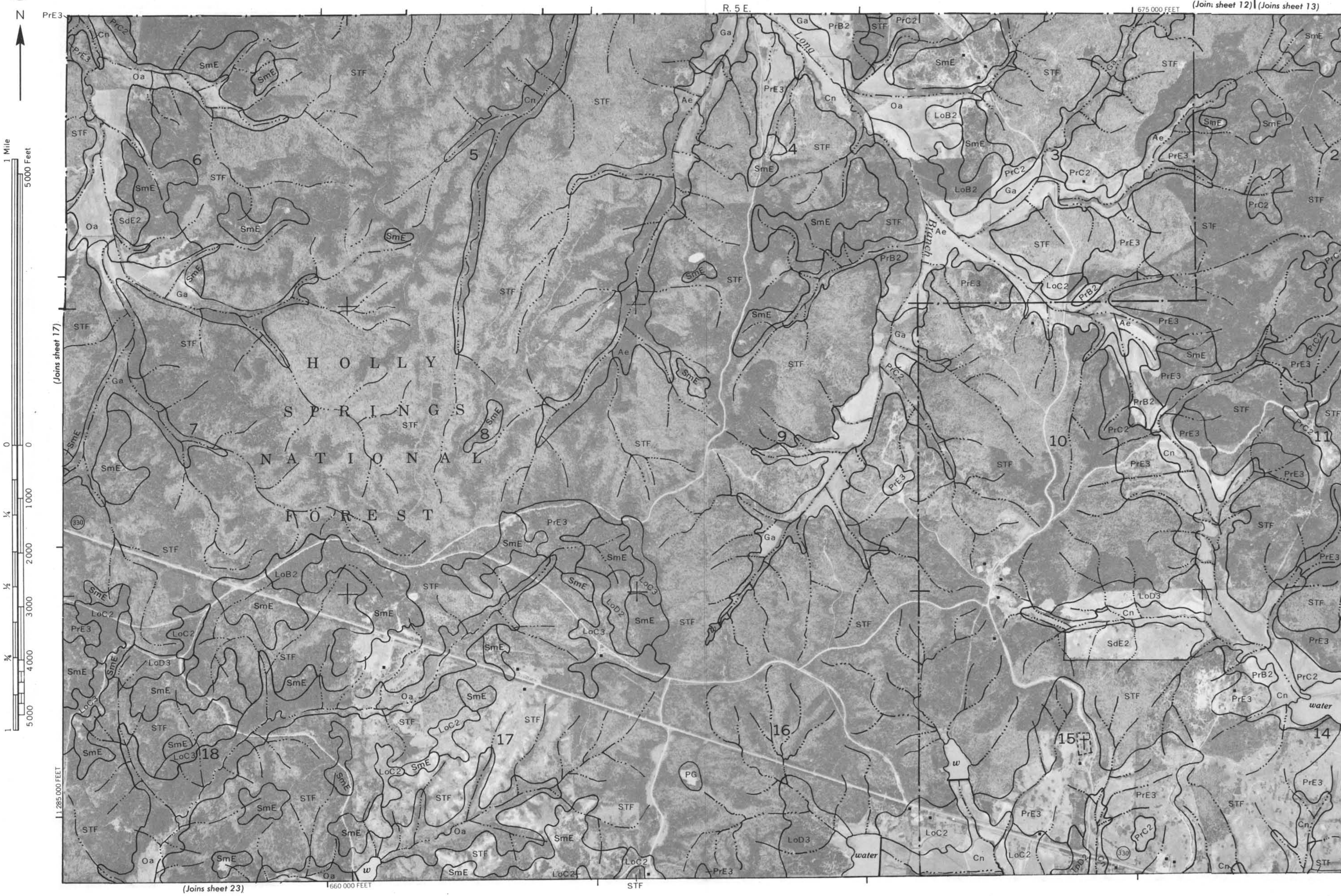


This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



YALOBUSHA COUNTY, MISSISSIPPI NO. 17

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

19

YALOBUSHA COUNTY, MISSISSIPPI NO. 19

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20

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

YALOBUSHA COUNTY, MISSISSIPPI NO. 21

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

22

YALOBUSHA COUNTY, MISSISSIPPI — SHEET NUMBER 22

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YALOBUSHA COUNTY, MISSISSIPPI NO. 22

23

YALOBUSHA COUNTY, MISSISSIPPI NO. 23

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YALOBUSHA COUNTY, MISSISSIPPI NO. 24

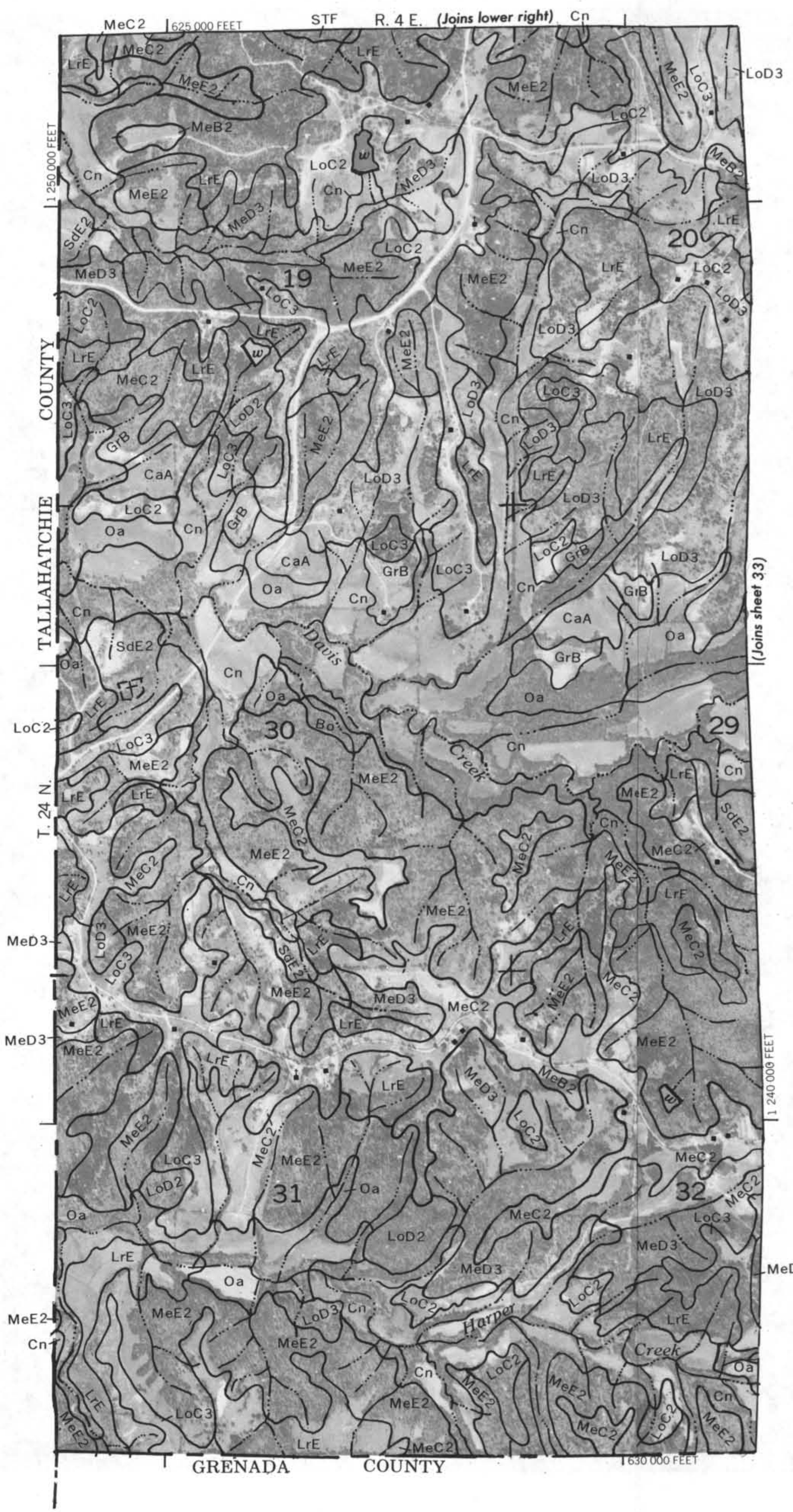

25
N
705 000 FEET
GrB
R. 6 E. | R. 7 E.
(Joins sheet 20)
1 280 000 FEET
T. 25 N.
(Joins sheet 24)
(Joins sheet 26)
(Joins sheet 31)
1 270 000 FEET
725 000 FEET
1 Mile
5000 Feet
0 1000 2000 3000 4000 5000
¼ ½ ¾
22 23 24 19 20
27 26 25 30 29
34 35 36 31 32
Moreland Creek
Turkey Creek
Hurricane Creek
Branch
GAS
GULF
CENTRAL
ILLINOIS
water
STF SdE2 PrE3 SmE PrC2 Ga Oa GrB CaA MAE TpD2 PvD3 LoB2 Cn Cc Bo Ar PrB2 Ae Br GrA LoC3

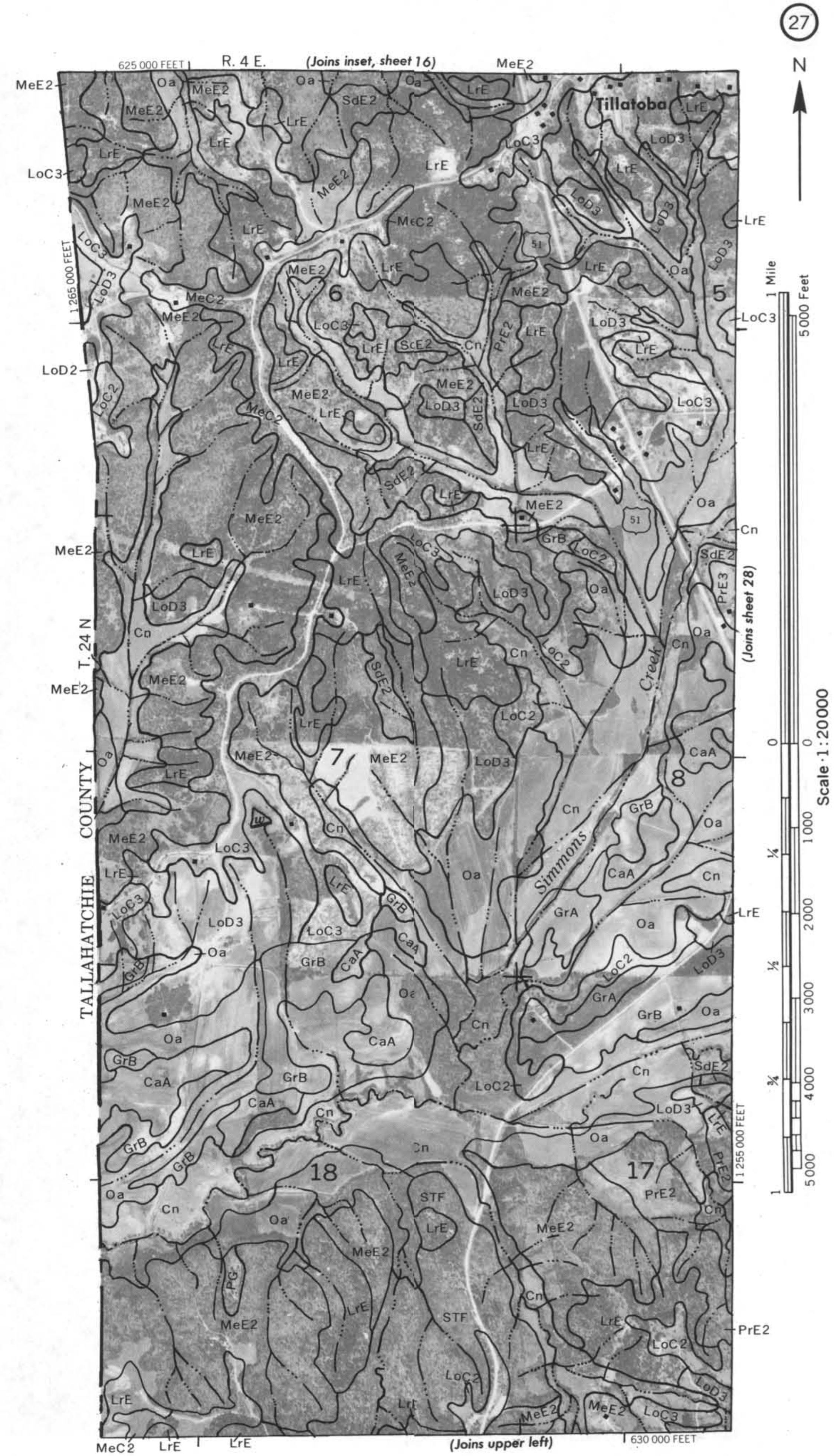
YALOBUSHA COUNTY, MISSISSIPPI — SHEET NUMBER 26

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

YALOBUSHA COUNTY, MISSISSIPPI NO. 26

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

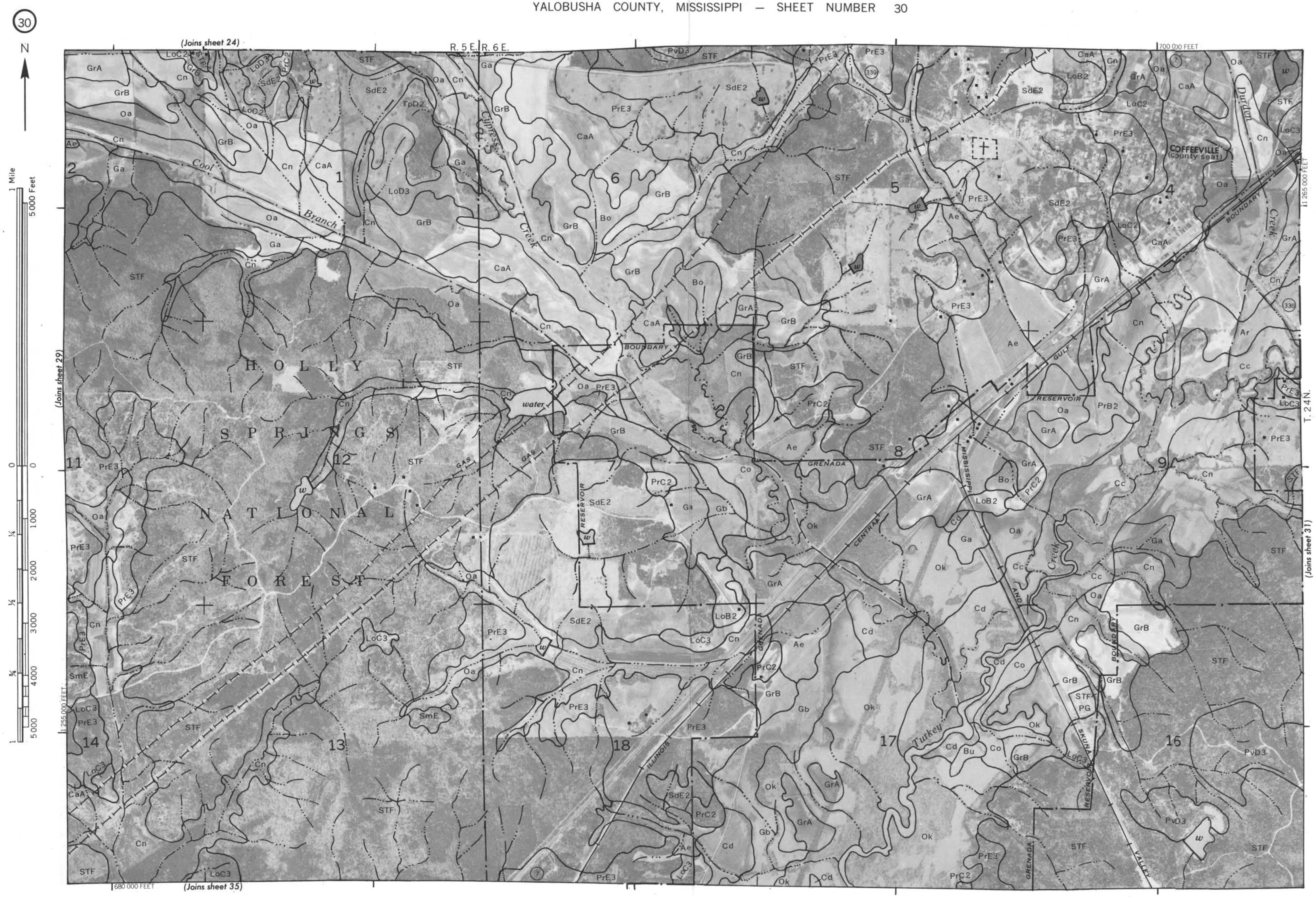




This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

YALOBUSHA COUNTY, MISSISSIPPI NO. 29

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

YALOBUSHA COUNTY, MISSISSIPPI NO. 31

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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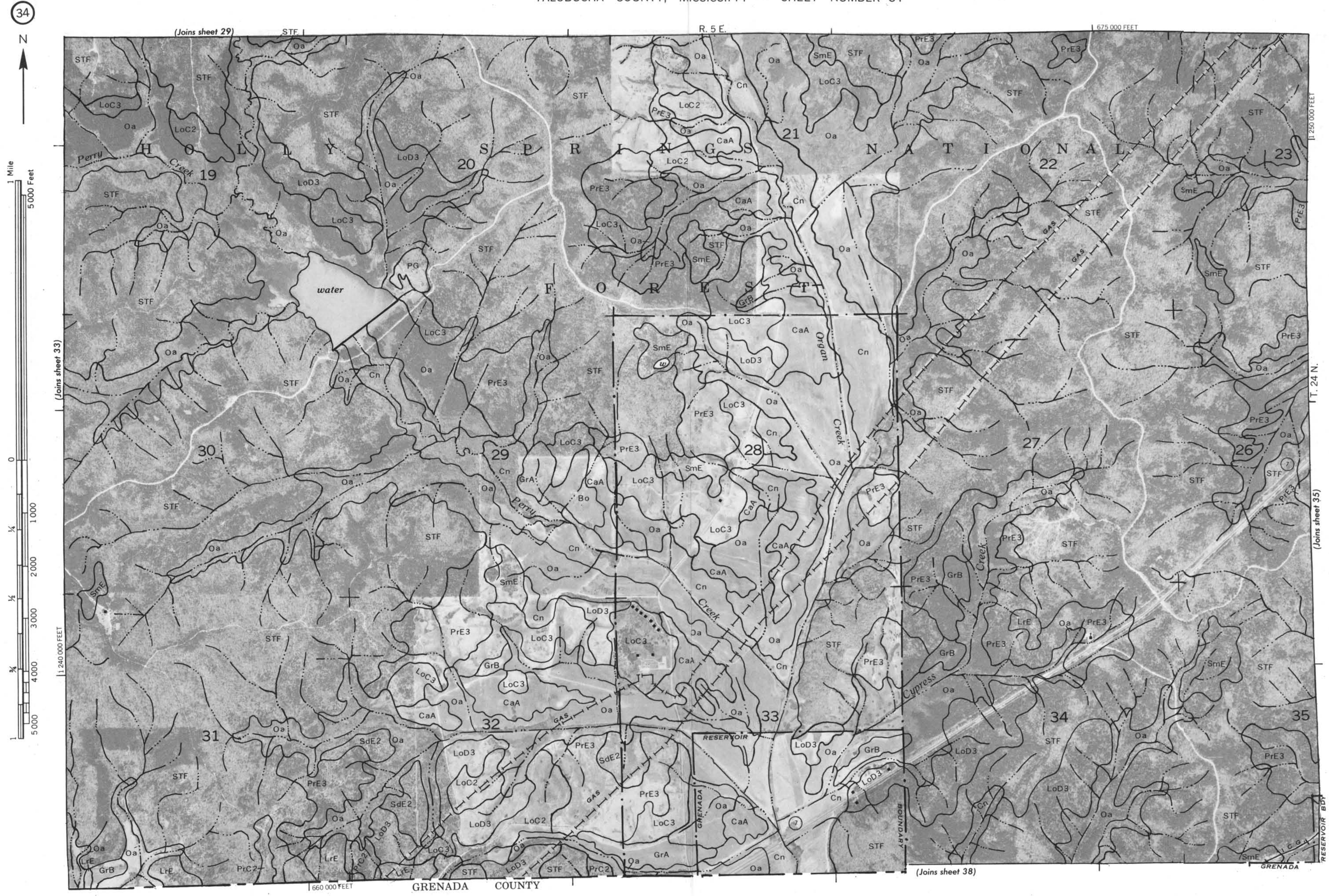
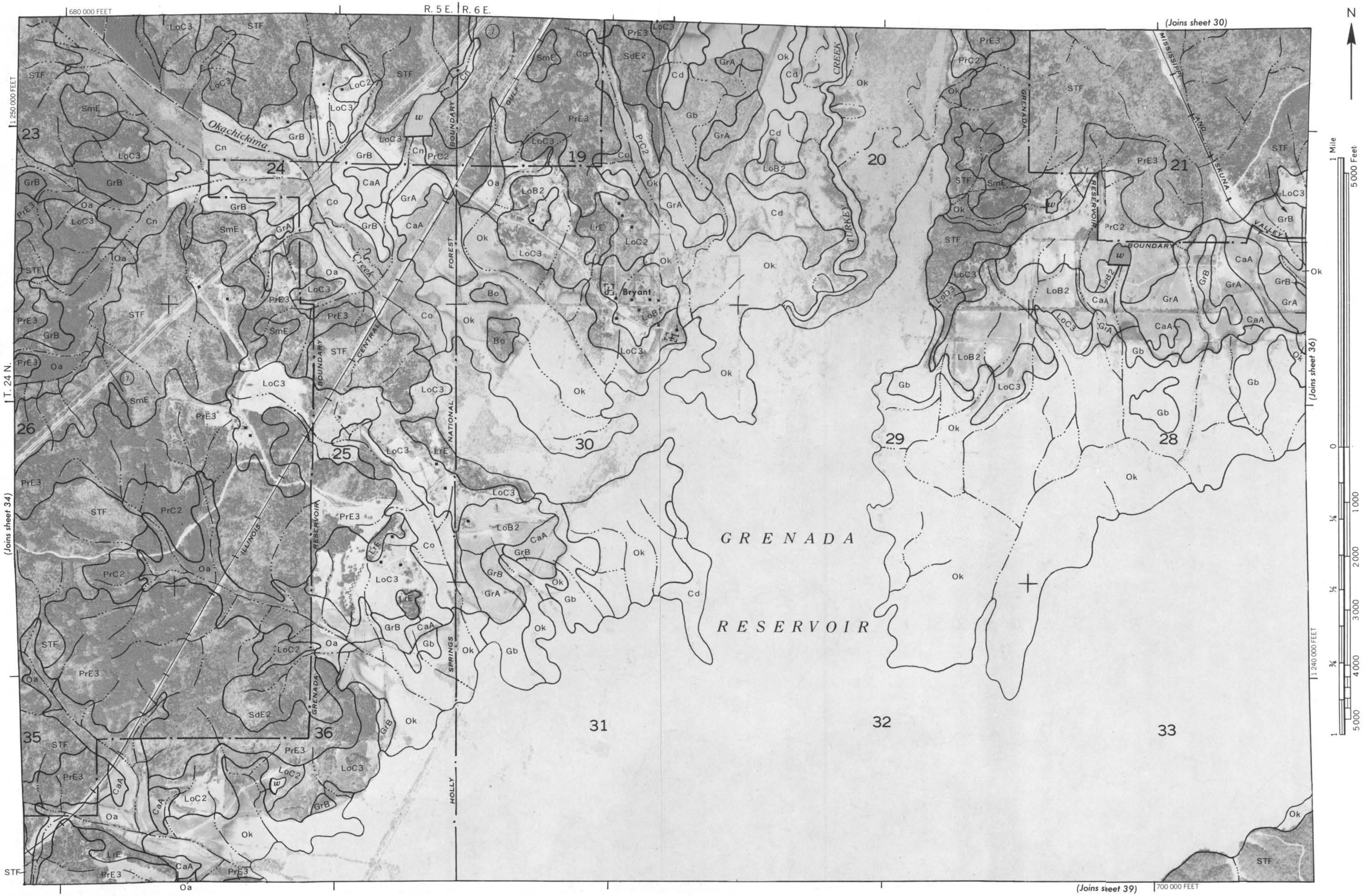
YALOBUSHA COUNTY, MISSISSIPPI NO. 33
This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



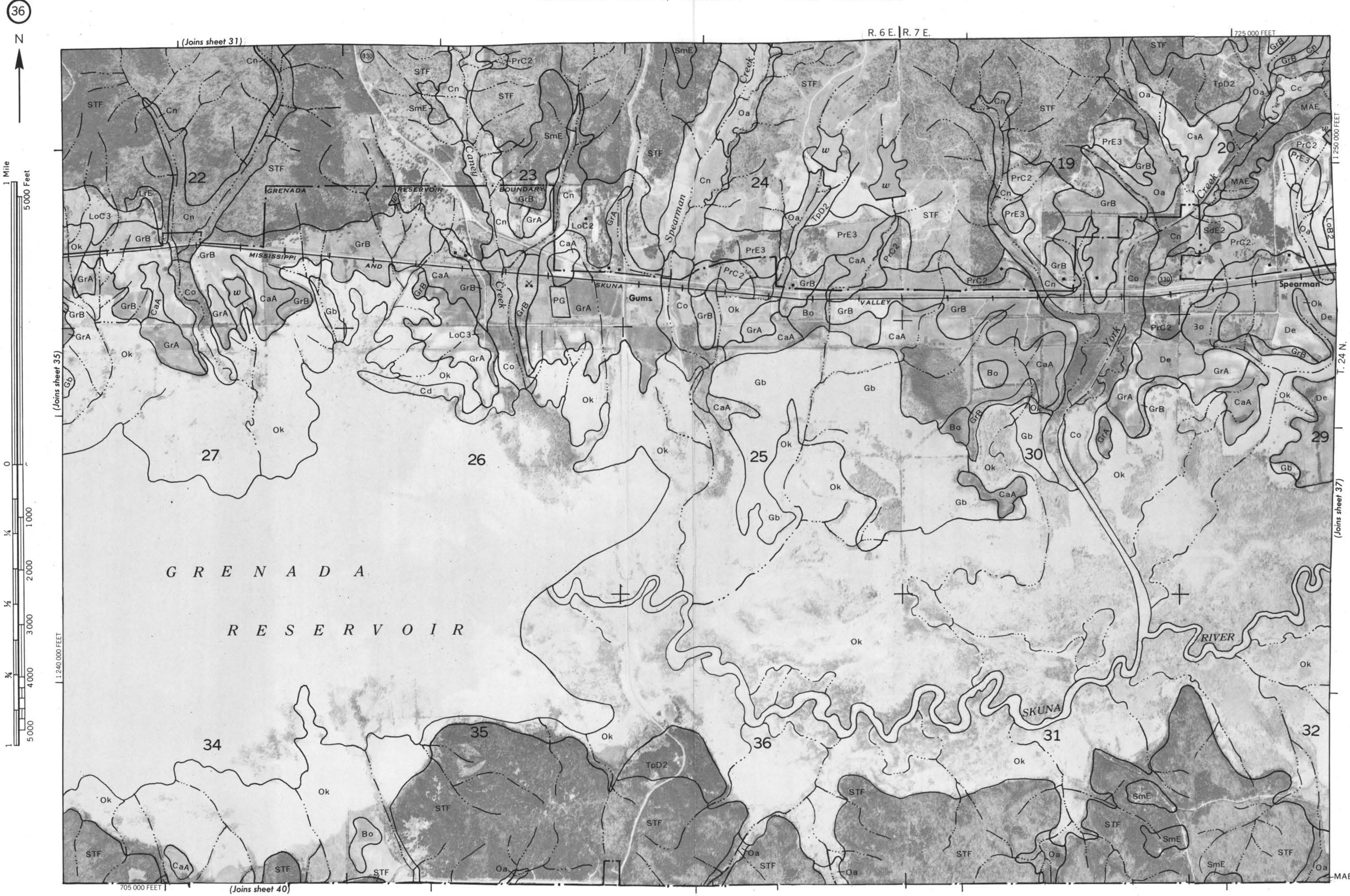
This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

35



YALOBUSHA COUNTY, MISSISSIPPI NO. 35

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
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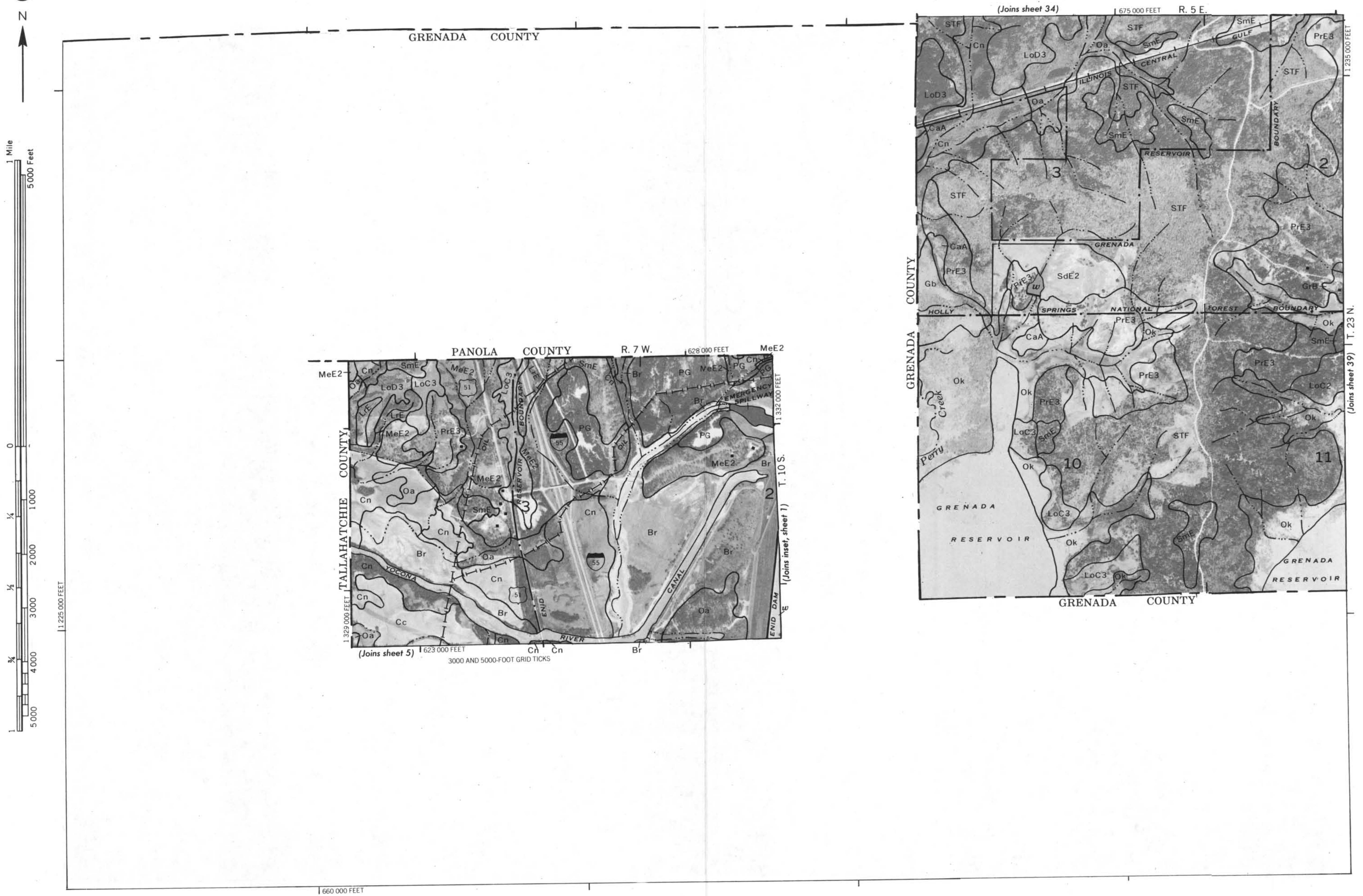
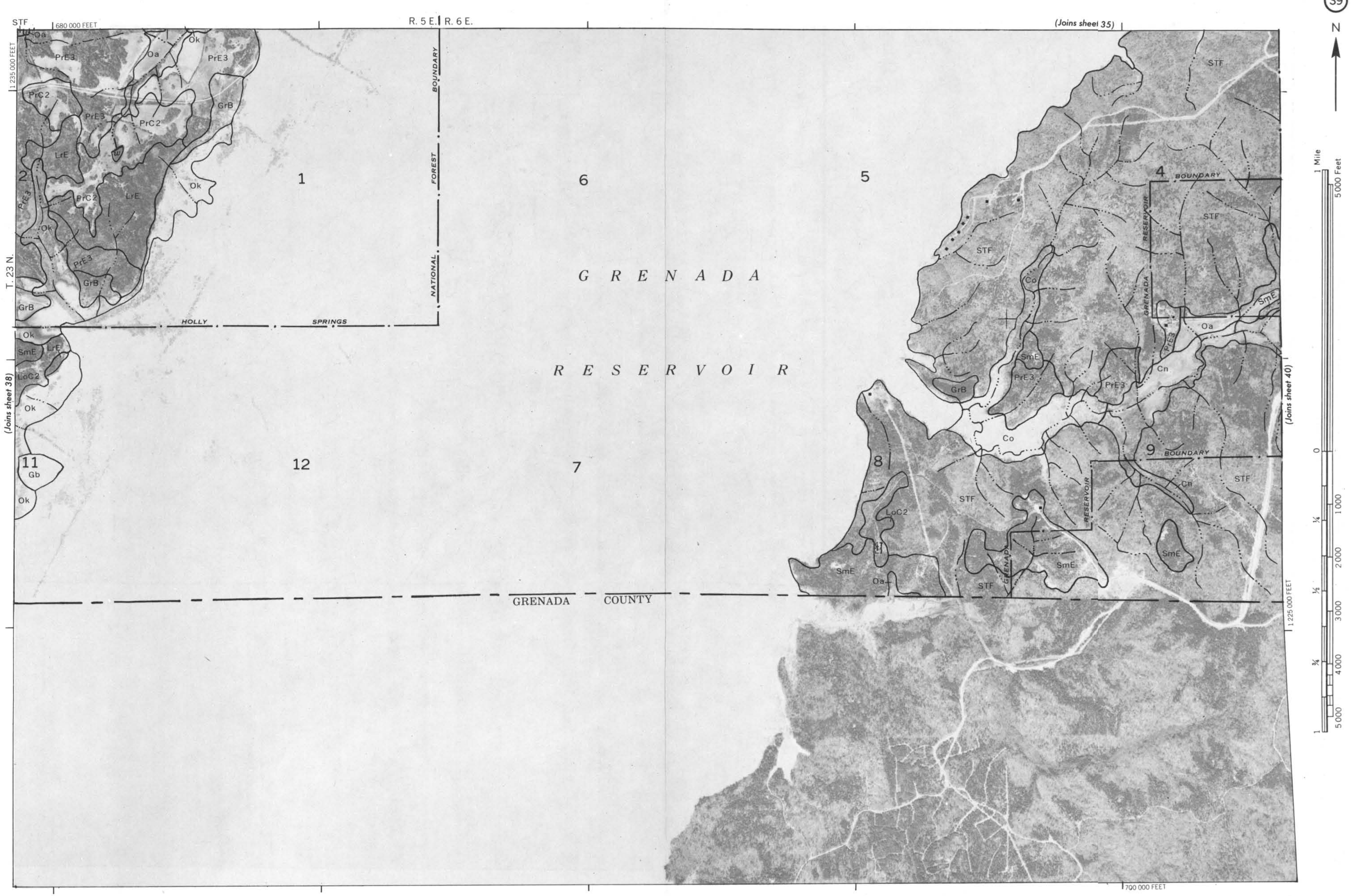
YALOBUSHA COUNTY, MISSISSIPPI NO. 37

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



YALOBUSHA COUNTY, MISSISSIPPI NO. 39

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
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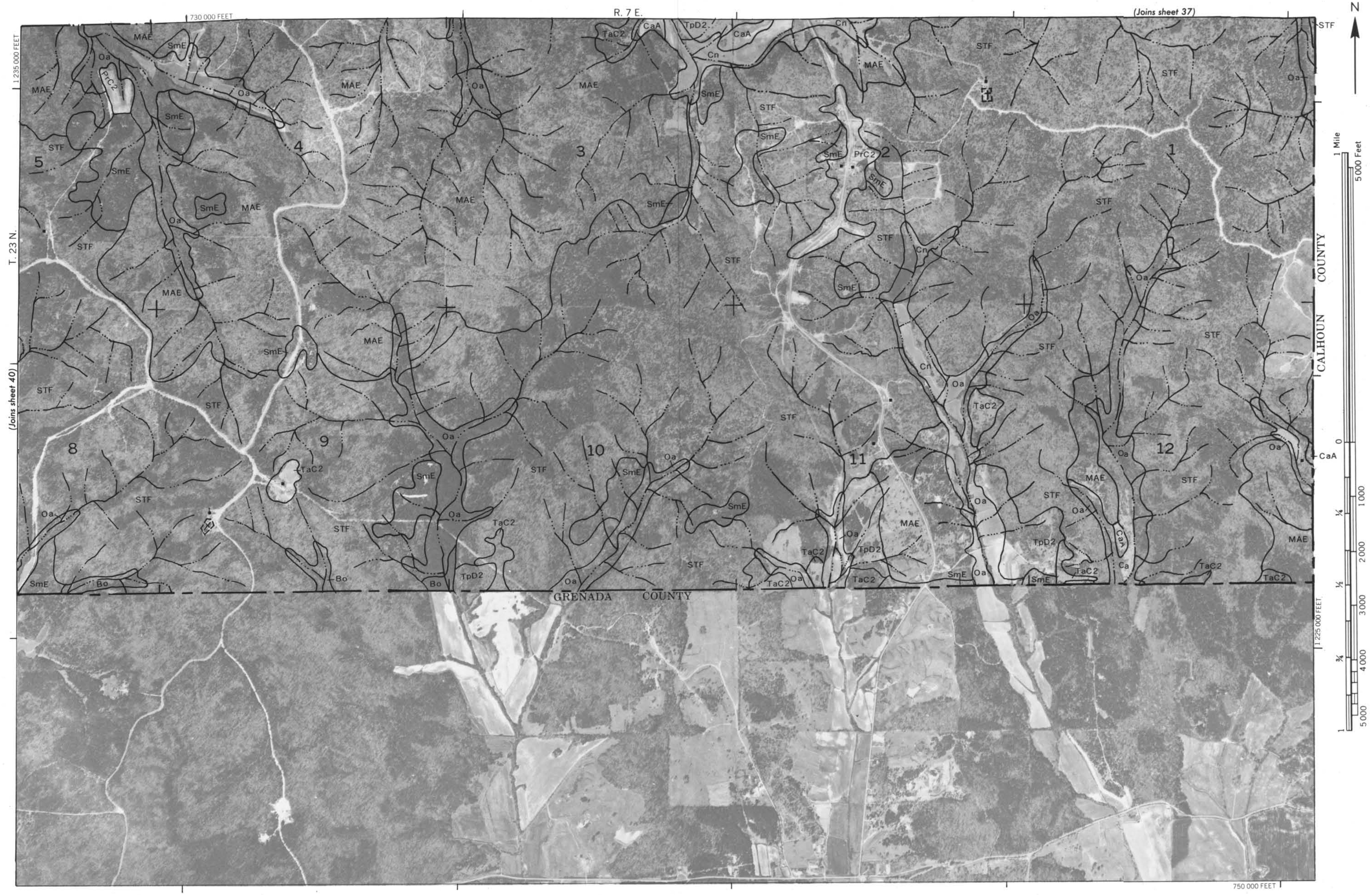

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.